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BOTANICAL SERIES

FIELD MUSEUM OF NATURAL HISTORY
FOUNDED BY MARSHALL FIELD, 1893

VOLUME XIII

FLORA OF PERU

PART I, No. 3

BY
J. FRANCIS MACBRIDE
ASSISTANT CURATOR OF THE HERBARIUM, DEPARTMENT OF BOTANY

B. E. DAHLGREN
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EDITOR

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FLORA OF PERU

J. Francis Macbride

17. CYCLANTHACEAE. Cyclanthus Family

By Paul C. Standley

Plants herbaceous or somewhat woody and with long jointed rhizomes; petioles sheathing at base; leaf blades flabellate-nerved or pinnate-nerved, the blades usually biparted or flabellately parted, rarely entire; flowers borne on spadices, these pedunculate, globose or oblong, arising within the leaf sheaths; flowers of the two sexes arranged in whorls or spirals, provided with a rudimentary perianth or naked; ovaries deeply immersed in the spadix and coherent, forming a syncarp; placentae 2 or 4, multiovulate; seeds numerous, small.

In appearance the plants of this family are palm-like, and they are likely to be mistaken for palms by the uninitiated. The epiphytic and scandent species are unlike any palms of similar habit in having usually bifid leaves. The terrestrial plants of the family are wholly herbaceous, in that respect differing from most palms. The fruiting spadices, of course, are quite different from the fruits of any of the palms.

Staminate flowers grouped in clusters of 4, with a pistillate flower between them; staminate flowers with a perianth; fruiting spadix oblong or globose, not screw-like. Plants terrestrial or epiphytic, the leaves various.....1. *Carludovica.*

Staminate flowers numerous, confluent, forming whorls or spirals, these alternating with whorls or spirals of pistillate flowers; staminate flowers without a perianth; fruiting spadix elongate, resembling in general appearance a screw. Plants terrestrial; leaf blades bifid almost or quite to the base.....2. *Cyclanthus.*

1. CARLUDOVICA R. & P.

Plants terrestrial and herbaceous, or often epiphytic and with elongate, somewhat woody, jointed, creeping or scandent stems; leaf blades membranaceous-coriaceous, variable in form; spadix simple, subtended by 1–several concave spathes, these densely imbricate before anthesis; rachis cylindric or ellipsoid, fleshy, densely covered

with the flowers; staminate perianth stipitate, the margin oblique, dentate; stamens numerous from a fleshy disk, the filaments thick, the anthers erect, 2-celled; pistillate perianth 4-angulate, somewhat 4-lobate; staminodia 4, opposite the sepals and adnate to them, greatly elongate and filiform; stigmas 4 on the apex of the ovary, broadly sessile, confluent by pairs, forming a cross.

Leaf blades flabelliform-parted, the 4 segments broadened at the apex and cleft or dentate. Plants terrestrial, tall . . . *C. palmata.*

Leaf blades bifid or rarely entire.

Leaf segments broadened upward and oblique at the apex, sometimes truncate, erose or cleft.

Plants epiphytic, scandent; spadix about 13 cm. long. *C. latifrons.*

Plants terrestrial, acaulescent; spadix about 5 cm. long. *C. humilis.*

Leaf segments acuminate, entire.

Leaf blades 60–120 cm. long . . . . . *C. angustifolia.*

Leaf blades mostly 20–50 cm. long.

Blades cleft less than halfway to the base. Plants epiphytic, with elongate stems . . . . . *C. trigona.*

Blades cleft more than halfway to the base.

Spadix stipitate. Leaf segments narrowly linear, 1.5 cm. wide . . . . . *C. Williamsii.*

Spadix sessile; leaf segments lance-linear, 2–5 cm. wide or broader.

Leaf blades triplinerved, both the central and lateral nerves emitting secondary nerves . . . *C. tetragonopus.*

Leaf blades 1-nerved, the nerves all arising from the costa. *C. chelidonura.*

Carludovica acuminata R. & P. Syst. Veg. 293. 1798; Drude in Mart. Fl. Bras. 3, pt. 2: 239. *pl. 57, f. 2.* 1881. *Ludovia acuminata* Pers. Syn. Pl. 2: 576. 1807. *Salmia acuminata* Willd. Ges. Naturf. Freund. Berlin Mag. 5: 401. 1811.

The species was described by Ruiz and Pavón from Posuso and Muña (Huánuco). The brief description reads: Caudex repent, flexuous; fronds furcate to below the middle, the segments linear-lanceolate, acuminate. Evidently it, like the other descriptions of the same authors in the same work, is altogether too incomplete for

determination of the plant concerned, without reference to specimens on which the name was based. Poeppig and Endlicher described at length under the name *acuminata* a plant growing "in forests from the foot of the Andes to the mouths of the Amazon." Drude (loc. cit.) states that Poeppig's plant is not *C. acuminata* R. & P., and describes it as new, under the name C. *divergens*. The plant described and figured by Drude seems to me to be the same as that listed below under the name *C. trigona*. I believe it rather probable that Drude's *C. divergens* really is *C. acuminata*. Drude's *C. acuminata* has leaves bifid less than halfway to the middle, while Ruiz and Pavón make scarcely a single definite statement regarding their plant other than that its leaves are bifid to below the middle. As matters stand, the name *C. acuminata* must remain doubtful until a Ruiz and Pavón specimen can be examined and described.

Carludovica angustifolia R. & P. Syst. Veg. 292. 1798; P. & E. Nov. Gen. & Sp. 2: 37. 1838. *Ludovia angustifolia* Pers. Syn. Pl. 2: 576. 1807. *Salmia angustifolia* Willd. Ges. Naturf. Freund. Berlin Mag. 5: 401. 1811.

Terrestrial; leaves very numerous, 2–2.5 meters high; petioles subterete, obtusely tetragonous above; blades deeply bifid, the segments linear-lanceolate, short-acuminate, 50–120 cm. long, bright green, rigid; inflorescences erect, 15 cm. long, the spadix cylindric; spathes distant, pink; fruit purple.

Huánuco: Described from Muña and Chinchao. Poeppig reports the plant from Cerro de San Cristóbal near Cochero.

The description is taken from that of Poeppig; the one given by Ruiz and Pavón is too brief to be of service. Whether Poeppig had any good reason for assuming his plant to be the same as that originally named, I do not know. He states that the plant, with its stiff leaves and woody but elastic petioles, forms dense and impenetrable thickets, like those of some dwarf palms, in rocky places of the drier mountains. The leaves are said to be one of the most satisfactory materials for thatching huts. The vernacular names are reported as "yacha piña" and "piña brava."

Carludovica chelidonura Drude in Mart. Fl. Bras. 3, pt. 2: 238. *pl. 57, f. 1.* 1882.

Plants either epiphytic or terrestrial, acaulescent or with stout elongate stems; leaves short-petiolate, the blades furcate almost to the base, the broad segments acuminate, entire, many-nerved; spadix stalked, subtended by 2 or more broad spathes, 2–6 cm. long.

Junín: Cahuapanas, epiphytic in dense forest, 340 meters, *Killip & Smith 26808*.—Loreto: Iquitos, moist land, *Williams 7989; Killip & Smith 27043*. Puerto Arturo, in forest, *Williams 5267*. Balsapuerto, on rocks in stream bed, *Killip & Smith 20468*. Pebas, *Williams 1667*.—San Martín: Tarapoto, in water, *Williams 6317*. San Roque, edge of water, *Williams 7715*. Also in Brazil. "Yacu sisa."

Carludovica divergens Drude in Mart. Fl. Bras. 3, pt. 2: 241. 1881. *C. acuminata* P. & E. Nov. Gen. & Sp. 2: 37. 1838, non R. & P. (?)

Stems short and rooting along tree trunks or climbing high on trees, slender; leaves small, mostly 20–30 cm. long; the slender petioles 3–7 cm. long; blades bifid almost to the base, rather thin, plicate, the segments broadly linear, usually 1–1.5 cm. wide, evenly long-attenuate; peduncles short, bearing several short spathes; spadix 1.5–2.5 cm. long, many-flowered, subglobose or ellipsoid; blades of leaves on sterile branches sometimes entire, 10–20 cm. long and 2–2.5 cm. wide.

Junín: Río Masamerich, 2,000 meters, *Weberbauer 6661*.—Loreto: Reported by Drude from Prov. Mainas, presumably collected by Poeppig. According to Drude, ranging to the mouth of the Amazon.

According to Poeppig, the stems were used for tying together the framework of huts, a purpose for which they are well suited because of their strength and pliability. He records the vernacular name as *tamschi*.

Huber (Bol. Mus. Goeldi 4: 538. 1906) refers doubtfully to this species a plant known by the name *tamshi*, growing abundantly along the Río Ucayali, and climbing on high trees. Its stems are used as cordage. Concerning the plant Huber makes the following statement: Regarding the *tamshi* there exists in all cisandine Peru a curious belief. They say that the *tamshi* is generated from the issula ant (*Dinoponera grandis*). The basis for this belief is probably the fact that this ant often is attacked by certain fungi of the Hypocreaceae (*Cordiceps*). Before dying the issula attaches itself to the bark of some tree, and the fruiting body that arises from it has somewhat the appearance of a plant in germination. The natives, finding these ants with fruiting bodies of *Cordiceps* projecting from their heads, assured me that this was the *tamshi* springing from the issula.

Carludovica elegans Dammer ex Huber, Bol. Mus. Goeldi 4: 538. 1906.—This name is practically a nomen nudum, although the description is scarcely inferior to those given by Ruiz and

Pavón: "A scandent plant with large broad leaves bifid one-third the distance to the base." The name was based upon *Huber 1524* from Pampa del Sacramento.

Carludovica humilis P. & E. Nov. Gen. & Sp. 2: 37. 1838. *Salmia humilis* Steud. Nom. Bot. ed. 2. 2: 501. 1841.

Plant terrestrial, acaulescent; leaves numerous, 1.2 meters long; leaf blades deltoid, many-nerved, cuneate at the base, plicate between the nerves, thin, bright green, paler beneath, bifid, the segments truncate, erose and often irregularly cleft; petioles semiterete, as long as the blades; spadix cylindric, 5 cm. long, borne on a stalk about 15 cm. long.

Loreto: Type collected at Yurimaguas by Poeppig.

Carludovica latifolia R. & P. Syst. Veg. 292. 1798. *Ludovia latifolia* Pers. Syn. Pl. 2: 576. 1807. *Salmia latifolia* Willd. Ges. Naturf. Freund. Berlin Mag. 5: 401. 1811.

Described by Ruiz and Pavón from Chinchao, Muña, Posuso, and Cochero (Huánuco), in tropical forests. The description is too brief for recognition of the plant, affording only the following data: Caudex an ell long, rooting; leaf blades bifid to beyond the middle, the segments lanceolate; petioles canaliculate.

Carludovica latifrons Drude in Mart. Fl. Bras. 3, pt. 2: 237. *pl. 58, f. 1.* 1881.

Plant epiphytic, with a thick caudex; leaves about 120 cm. long; blades equaling the petiole, bifid almost to the middle, the segments broadened upward, very oblique, obtuse, the costa 3-parted at the base, the lateral nerves remote from the margin; spadix 13 cm. long, 1.5 cm. thick, the peduncle compressed, 10 cm. long; spathes 3.

Junín: Puerto Yessup, 400 meters, *Killip & Smith 26240.* Cahuapanas, 340 meters, *Killip & Smith 26810.* Near La Merced, 800–1,300 meters, *Killip & Smith 23984.*—Loreto: Santa Rosa, 135 meters, *Killip & Smith 28788.* Reported by Huber (Bol. Mus. Goeldi 4: 537. 1906) from Cerros de Contamana, Canchahuayo, etc. Amazon Valley of Brazil.

Carludovica palmata R. & P. Syst. Veg. 291. 1798; Drude in Mart. Fl. Bras. 3, pt. 2: 234. *pls. 54, 55.* 1881. *Ludovia palmata* Pers. Syn. Pl. 2: 576. 1807. *Salmia palmata* Willd. Ges. Naturf. Freund. Berlin Mag. 5: 401. 1811.

Plants terrestrial, acaulescent, densely cespitose and stoloniferous, the slender petioles subterete, 3–5 times as long as the

blades; leaf blades parted into 4 segments, those broadly cuneate, many-nerved, deeply laciniate at the broad apex; spadix oblong, acutish, about 12 cm. long, many-flowered, borne on a short thick peduncle; spathes 3, concave, 12 cm. long, acute.

Amazonas: Rioja, Moyobamba, *Williams 7599.*—Huánuco: Described from forests of Posuso and Cochero, *Ruiz & Pavón.* Cochero, *Poeppig.*—Loreto: Puerto Arturo, Yurimaguas, *Williams 5091.* Cerro de Canchahuayo (*Huber*). Extending north through Central America.

"Bombonaje," "appi-ttara." Ruiz and Pavón state that walking sticks were made from the petioles; that the leaves were used for thatching; and that oil could be obtained from the seeds of this and other species. The most important use of the plant, of course, is the utilization of the fine fiber of the young leaves for plaiting the so-called "Panama" or "Jipijapa" hats, most of which are manufactured in Ecuador. In some regions of Peru fine hats are made from this plant, but in Central America, for instance, where it is abundant, little or no use is made of the fiber.

Carludovica tetragonopus Mart. ex Drude in Mart. Fl. Bras. 3, pt. 2: 238. *pl. 4.* 1882.

Plants epiphytic and with long stout stems, or terrestrial and acaulescent or with short stems; leaves on rather long and slender petioles, the large blades cleft nearly to the base, the segments entire, acuminate, many-nerved, rather stiff; spadix stout, about 4–5 cm. long, many-flowered, subtended by 4 or more large spathes.

Junín: Puerto Yessup, terrestrial, with an erect caudex 30 cm. high or less, 400 meters, *Killip & Smith 26242.* Eneñas, 1,700 meters, dense forest, *Killip & Smith 25657.* Santa Rosa, 625–900 meters, epiphytic, *Killip & Smith 26156.*—Loreto: Paraíso, in forest, *Williams 3248.* Santa Rosa, *Williams 4814.* Between Yurimaguas and Balsapuerto, 150 meters, epiphytic, *Killip & Smith 28139.* Balsapuerto, 150–350 meters, terrestrial, *Killip & Smith 28384.* Santa Rosa, *Killip & Smith 28905* (epiphytic). Brazil.

Carludovica trigona R. & P. Syst. Veg. 293. 1798; P. & E. Nov. Gen. & Sp. 2: 36. *pl. 151.* 1838. *Ludovia trigona* Pers. Syn. Pl. 2: 576. 1807. *Salmia trigona* Willd. Ges. Naturf. Freund. Berlin Mag. 5: 401. 1811.

Plants usually epiphytic and with much elongate, more or less woody stems, sometimes, however, terrestrial (according to notes),

but apparently then also with long creeping stems; leaves mostly at the tips of the branches, chiefly 45–60 cm. long, rather thin, somewhat paler beneath, the blades long-cuneate at the base, bifid less than halfway to the middle, the segments evenly or abruptly long-attenuate or acuminate; petiole usually much shorter than the blade; peduncles shorter than the petioles; spathes 4, elliptic, acuminate, concave, about 7 cm. long, whitish outside, pinkish within; spadix cylindric, densely many-flowered, 5 cm. long or sometimes shorter.

Huánuco: Type from Muña, *Ruiz & Pavón*. Forests of Cochero, *Poeppig*.—Loreto: Puerto Arturo, Yurimaguas, *Williams 5083, 5281; Killip & Smith 27784*. Mishuyacu, near Iquitos, 100 meters, *Killip & Smith 29915*. Balsapuerto, *Killip & Smith 28503, 28677, 28579, 28440, 28380*. Iquitos, *Killip & Smith 27331*. Santa Rosa, *Killip & Smith 28958*. San Antonio, *Killip & Smith 29430*.

The plants listed above are the same as that described by Poeppig and Endlicher under the name *trigona*, but there is less certainty that they are the one so named by Ruiz and Pavón.

Carludovica Williamsii Standl. Field Mus. Bot. 11: 146. 1936.

Plants terrestrial, acaulescent, 45 cm. high or somewhat taller; leaf blades long-tapering to the base, bifid almost to the base, the segments linear, long-attenuate, about 1.5 cm. wide, strongly plicate between the nerves; peduncles 20 cm. long or more, very slender; spathes about 3, narrow, 7–8 cm. long, very long-tapering; spadix ellipsoid, 3 cm. long or more, many-flowered, conspicuously stipitate. "Yacu-sisa."

San Martín: San Roque, on stream bank, 1,400 meters, *Williams 7477*, type.

2. CYCLANTHUS Poit.

Large acaulescent perennial herbs; leaves few, sheathing, dichotomously binerved, at maturity deeply bifid; spadix terminal, long-pedunculate, the rachis ellipsoid, subtended by several spathes, the flowers of either sex densely verticillate and confluent; staminate flowers without a perianth; stamens 6, the filaments united at the base, the anthers 2-celled, longitudinally dehiscent; staminate flowers connate, the perianth connate and multidentate; ovaries immersed in the rachis in a common cavity; fruiting spadix composed of distinct swollen disks, the disks sulcate and bearing the seeds within.

Cyclanthus bipartitus Poit. Mém. Mus. Hist. Nat. 9: 36. *pl. 2.* 1822; Poepp. & Endl. Nov. Gen. & Sp. 2: 38. *pl. 152, 154.* 1838. *Discanthus odoratus* Spruce, Journ. Linn. Soc. Bot. 3: 196. 1859.

Plants large and coarse, 1–2 meters high; petioles slender, 50–100 cm. long, subterete or somewhat angled; blades of about the same length, rather thin, bifid almost or quite to the base, the segments acute at each end, lance-linear, usually 5–10 cm. wide, with a conspicuous stout median nerve; scapes 45 cm. long or more; spathes 4–5, convolute before anthesis, later spreading; spadix about 10 cm. long.

Huánuco: Reported from Cochero by Poeppig.—Loreto: Caballococha on the Amazon, in forest, *Williams 2355.* La Victoria on the Amazon, in forest, *Williams 2984.* Agua Blanca, Alto Río Nanay, *Williams 1187.* Mishuyacu, near Iquitos, 100 meters, in forest, *Klug 1018.* Reported by Poeppig from Yurimaguas.—San Martín: Reported by Huber from Cerro de Canchahuayo, growing chiefly along streams. Ranging from the Amazon Valley to the Guianas and Central America.

"Sangapillo." The flowers have a pleasing fragrance, described by Poeppig as being between those of cinnamon and vanilla. The large bifid leaves are distinctive, also the curious fruiting spadix, which resembles a large screw.

18. ARACEAE. Arum Family

Aroids as a group, comprising herbs, lianas and shrubs, epiphytes, and even aquatics, are among the most beautiful and curious of plants. Some are strange or, both strange and beautiful, approach the fantastic. Others, if lacking in magnificence, are often glorious in the vigor and luxuriousness of their development. Consequently they have long been popular in conservatories, especially species of *Caladium* and *Dieffenbachia* for their often colored foliage, and most other genera, to some extent, for their interest or beauty. The foliage of some species is entirely different when the plants are young; many of the small vines on forest trees with leaves tightly pressed against the tree trunks are juvenile forms of aroids. Some tribes of the family are distinguishable from others by the presence of calcium oxalate crystals in the watery sap. These are readily detected upon chewing by a burning sensation, since their needle-like form enables them to penetrate the tongue. The economic importance of aroids, except in horticulture, although various, is not particularly great,

but often of local significance. Some of the plants found useful in Peru and other parts of South America are:

Monstera pertusa, whose leaves, like those of similar species, serve as compresses for wounds; *M. deliciosa* and related forms have some reputation for their fruit; *Spathiphyllum cannifolium* is used to flavor tobacco; the roots of *Urospatha caudata* (apé or caa apé), when roasted in ashes, are sweet but cause an itching sensation (Peckolt); the tubers of *Dracontium polyphyllum* (jararaca or jiraca) serve as food, boiled or roasted; the leaves of various Philodendrons are used as ointments; the rhizomes of *Caladium sororium* and other species, and the tubers of *Xanthosoma*, etc., are eaten after cooking; the leaves of species of *Dieffenbachia*, chewed, result in speechlessness for a time, but unfortunately also in a swelling of the mouth; and many other remedial uses have been or are in vogue where the plants grow (cf. Engler, from whose compilation of uses I have drawn).

A. Plants not characteristically aquatic.

Flowers typically hermaphrodite, the spadix, as a result, uniform in thickness.

Leaves distichous; calcium oxalate crystals present, except in *Heteropsis*.

Leaves relatively remote and evidently alternate, the petioles only to 6 mm. long.....1. *Heteropsis*.

Leaves usually densely crowded and the petioles elongate.

Spathe more or less promptly deciduous; lianas.

Leaf nervation (principally) entirely parallel. 2. *Rhodospatha*.

Leaf nervation reticulate, except the primary lateral nerves.....3. *Monstera*.

Spathe persistent; herbs.....4. *Spathiphyllum*.

Leaves spirally arranged; calcium oxalate crystals often lacking; spathe persistent.

Leaf nervation principally parallel.....7. *Anthurium*.

Leaf nervation principally reticulate.

Leaves much divided (ours), or never as in the next. 5. *Dracontium*.

Leaves sagittate, the two lower lobes about as long as or longer than the upper.....6. *Urospatha*.

Flowers typically monoecious, the female and male portions of the spadix more or less distinctly marked by the varying thickness.

Male and female portions of the spadix obviously intercepted by a remotely flowered sterile or barren portion.

Completely intercepted; principal leaf nerves reticulate. 16. *Ulearum.*

Incompletely intercepted by remote sterile flowers; principal leaf nerves parallel.....8. *Dieffenbachia.*

Male and female portions of the spadix contiguous but often with sterile intermediate flowers.

Spathe not much longer than the spadix or shorter, its limb convolute or cymbiform; leaves never subequally 3-parted, the lateral lobes eared.

Spathe not constricted at the throat or, if so, the limb strongly convolute.

Spadix subequaling or shorter than the spathe.

Scandent plants; spadix partly sterile. 9. *Philodendron.*

Herbs; spadix usually entirely fertile.

Leaves entire.....10. *Homalomena.*

Leaves pinnate.....14. *Asterostigma.*

Spadix soon far exceeding the spathe.....15. *Taccarum.*

Spathe tube well defined, constricted at the throat, the limb cymbiform.

Style a fleshy disk; leaves sagittate, hastate, or dissected.....11. *Xanthosoma.*

Style none; leaves often peltate.....12. *Caladium.*

Spathe distinctly and often much longer than the spadix, its open limb spreading; leaves 3-parted, the lateral divisions usually ear-appendaged.....13. *Syngonium.*

A. Plants aquatic.....17. *Pistia.*

1. HETEROPSIS Kunth

High-climbing lianas with slender branches and heavy, oblong-lanceolate, very shortly petioled leaves with many parallel nerves. Spathe ovate-oblong, convolute, exceeding the spadix, deciduous. Ovary 2-celled above, the ovules 2, attached near the base. Flowers hermaphrodite, or the stamens of a few aborted.—The leaves are suggestive of those of the Guttiferae. Besides the following, *H.*

Spruceana Schott, with spathe scarcely 2 cm. long, and *H. longispathacea* Engler, with spathe 7 cm. long, are to be expected, since both are Amazonian. "Timbo-titica."

Heteropsis peruviana Krause, Notizbl. Bot. Gart. Berlin 9: 270. 1925.

Slender, the slightly flexuous branchlets 2–4 mm. thick; internodes 2–5 cm. long; petioles 4–6 mm. long, 2 mm. thick, grooved above throughout; leaves subcoriaceous, oblong-lanceolate, narrowly acuminate, acute at base, 1–1.5 dm. long, 2.5–3.5 cm. broad; lateral nerves equally distinct on both sides; peduncle terete, 1 cm. long; spathe drying black, oblong-elliptic, 3.5–4.5 cm. long, with a narrow acute acumen 1 cm. long; spadix stipitate, oblong, acutish, 2.5–3 cm. long, 5–7 mm. thick (in flower); fruit subobovoid, obtuse, 5–6 mm. long. Neg. 11833.

Junín: La Merced, 1,000 meters, *Weberbauer 1819*.

Heteropsis Jenmanii Oliv. in Hook. Icon. 20: *pl. 1949*. 1890.

Differs from *H. peruviana* in the stouter stems, distinctly reticulate-veined, heavier leaves, not infrequently broader, and in the longer (to 8 cm.) spathe and larger spadix.—According to Jenman, the original collector, the plant "sends down long aerial roots which, split into thin strips, form the most useful tying material the Indians employ." Tessmann, apparently, did not observe this use, but recorded in a note accompanying his specimens the following superstition, "believed by nearly all Loretians, even the most intelligent"; namely, that the plant never blooms but is in fact a fungus that grows from the head of the black ant called "ishula." The fungus is a long string-like plant known as "tamishi" (as also the *Heteropsis* itself).

Loreto: Mishuyacu near Iquitos, *Klug 713* (det. Krause). Mouth of Río Santiago, *Tessmann 4448* (det. Krause). British Guiana; Colombia. "Tamishi," "tamishi delgado."

2. RHODOSPATHA Poepp.

Reference: Engler & Krause, Pflanzenr. IV. 23B. 1908.

Suffrutescent and often scandent, with long-vaginate petioles and oblong-elliptic or lanceolate leaves. Spicular crystals numerous. Ovary 2-celled, the ovules affixed basally or laterally.—Several Ecuadorean species are to be expected. *Stenospermatium* Schott.

Leaves mostly about 1 dm. long.

Spadix about 3 cm. long; leaves acutely cusped..... *R. flavescens.*

Spadix finally about 6 cm. long; leaves long-acuminate. *R. Mathewsii.*

Leaves 1.5–4.5 dm. long.

Leaves 3–7 cm. broad.

Stipe 3–5 mm. long.

Spadix 3 cm. long, 5 mm. thick..... *R. Weberbaueri.*

Spadix 4–6 cm. long, 7 mm. thick..... *R. Spruceana.*

Stipe about 1 cm. long.

Spadix about 8 cm. long..... *R. amomifolia.*

Spadix about 6 cm. long..... *R. Mathewsii.*

Leaves 1–2 dm. broad.

Peduncles 6 dm. long, about equaling the leaves. *R. crassifolia.*

Peduncles 1.5–2.5 dm. long, much shorter than the leaves.

Leaves broadly elliptic, 1.5–2 dm. broad..... *R. latifolia.*

Leaves oblong-elliptic, 1–1.5 dm. broad..... *R. oblongata.*

Rhodospatha amomifolia (Poepp.) Macbr. Field Mus. Bot. 11: 7. 1931. *Stenospermatium amomifolium* Schott, Prodr. 348. 1860; 90. *Monstera amomifolium* Poepp. Nov. Gen. & Sp. 3: 88. 1845.

Petioles 7–10 cm. long, three-fourths vaginate; leaves little oblique, lanceolate-oblong, very acute at each end, 1.5–2.5 dm. long; peduncles about 1.5 dm. long; spathe oblong, acuminate; spadix 2.5–3.5 cm. long, to 1 cm. thick, the stipe up to 1 cm. long. Neg. 12162.

Huánuco: Pampayacu, *Poeppig.*—Junín: Colonia Perené, *Killip & Smith* (det. Krause).

Rhodospatha crassifolia (Engler) Macbr. Field Mus. Bot. 11: 7. 1931. *Stenospermatium crassifolium* Engler, Bot. Jahrb. 37: 114. 1905; 89.

Slender, with petioles to 3 dm. long, vaginate to 2 cm. below the coriaceous oblong-elliptic acute blades, these obtuse at base, 3–4.5 dm. long; peduncles 6 dm. long; spathe 2–2.5 dm. long, 6 cm. wide, pale green or yellowish; spadix to 2.5 dm. long and 2 cm. thick, the stipe 1 cm. long.—Illustrated, loc. cit. Neg. 12164.

Huánuco: South of Monzón, 1,700 meters, *Weberbauer 3512.*—Junín: La Merced, *Schunke 283* (det. Krause). Chanchamayo Valley, 1,200 meters, *Schunke 429* (det. Krause).

Rhodospatha flavescens (Engler) Macbr. Field Mus. Bot. 11: 7. 1931. *Stenospermatium flavescens* Engler, Bot. Jahrb. 37: 111. 1905; 82.

Petioles slightly shorter than the leaves and vaginate nearly their entire length; leaves 8–10 cm. long, 2.5–3 cm. broad; peduncles to 1.5 cm. long; spathe 5 cm. long, greenish, with a point 6 mm. long; spadix stipe 5 mm. long.—Illustrated, op. cit. 83. Doubtfully distinct from *R. Mathewsii.*

Huánuco: South of Monzón, 1,700 meters, *Weberbauer* 3506.

Rhodospatha latifolia Poepp. Nov. Gen. & Sp. 3: 91. *pl. 300.* 1845; 92.

Petioles 3.5 dm. long, broadly (3 cm.) vaginate to within 1 dm. of the thin, nearly opaque, elliptic blade, this 3–4.5 dm. long and 1.5–2.5 dm. broad, rounded or truncate at base, shortly cuspidate; peduncles 1.5–2 dm. long, mostly included in the leaf sheath; spathes fleshy, pale rose, ovate, acute, 15–18 cm. long, 5–7 cm. broad; spadix 1 to nearly 2 dm. long, short-stiped; flowers all hermaphrodite, violet.—*R. picta* Nicholson, said to be much cultivated and possibly Peruvian, has leaves subacute at base and a spadix 2 dm. long.—Illustrated, op. cit. 94.

San Martín: Tocache (*Poeppig*).—Huánuco: Pampayacu (*Poeppig*).—Puno: Sangabán (*Lechler 2490, 2491*).—Loreto: Cerro de Cumbaso, *Ule 6694.* Brazil.

Rhodospatha Mathewsii (Schott) Macbr. Field Mus. Bot. 11: 7. 1931. *Stenospermatium Mathewsii* Schott, Gen. Aroid. 70. 1858; 83.

Similar to *R. flavescens,* but the leaves somewhat longer, the peduncles longer, and the spadix 2–3 mm. long (or, in an Ecuadorean form, 1 cm. long).—Flowers rose (Klug). Neg. 12169.

Huánuco: Casapí (*Mathews*).—Loreto: Near Iquitos, *Klug 1200* (det. Krause).—Junín: Pichis Trail, *Killip & Smith.* Ecuador.

Rhodospatha oblongata Poepp. Nov. Gen. & Sp. 3: 91. 1845; 93.

Similar to *R. latifolia;* petiole sheath to 4 cm. broad at base but narrowed above to scarcely 2 cm. broad; leaves 1–1.5 dm. broad;

peduncles 2–2.5 dm. long; spathe abruptly long-cuspidate, greenish without; spadix sterile below, its stipe 1–2 cm. long.—Illustrated, Mart. Fl. Bras. 3, pt. 2: *pl. 17*.

San Martín: Tocache (*Poeppig*). Brazil.

Rhodospatha Spruceana (Schott) Macbr. Field Mus. Bot. 11: 7. 1931. *Stenospermatium Spruceanum* Schott, Gen. Aroid. 70. 1858; 85.

Vaginate petioles of the lower leaves to 2.5 dm. long; leaves coriaceous, oblong-elliptic-lanceolate, oblique, 2–2.5 dm. long; peduncles very slender; spathe to 11 cm. long; spadix 4–6 cm. long, 7 mm. thick, on a stipe 5 mm. long.—*R. popayanensis* (Schott) Macbr. has a spadix stipe 1–1.5 cm. long.—Illustrated, Mart. Fl. Bras. 3, pt. 2: *pl. 18*.

Loreto: Pongo de Cainarache, *Ule 6324*.—Junín: La Merced, *5527*. Iquitos, *Klug 516*. La Victoria, *Williams 2624* (all det. Krause). Brazil to Guiana and Colombia.

Rhodospatha Weberbaueri (Engler) Macbr. Field Mus. Bot. 11: 7. 1931. *Stenospermatium Weberbaueri* Engler, Bot. Jahrb. 37: 110. 1905; 87.

Stems about 5 dm. long; petioles vaginate two-thirds their length; leaves acuminate, acute at base; peduncles 1.5–2.5 dm. long; spathe cusp 6–7 mm. long; spadix 3 cm. long, 5 mm. thick, the stipe 3 mm. long.—Illustrated, Pflanzenr. IV. 23B: 86. Neg. 12175.

Huánuco: Near the Monzón, 600 meters, *Weberbauer 3653*.—Junín: La Merced, 1,200 meters, *Schunke 283* (det. Krause).

3. MONSTERA Adans.

Reference: Engler & Krause, Pflanzenr. IV. 23B. 1908.

Vigorous lianas with long-vaginate petioles and broad or narrow leaves, often perforated, less frequently entire or pinnatifid. Spicular crystals numerous. Ovary usually 2-celled, the ovules commonly 2 in each cell.—Besides the following, the Amazonian and somewhat aberrant species, *M. occidentalis* (Poeppig) Schott, with a solitary ovule, may be found. It has pinnately dissected leaves, with the petioles (3–6 dm. long) a meter long or longer, and an obtuse spathe, white without and rose within. The leaves of *M. pertusa* and related forms serve as compresses for wounds. The species, or probably often mere races, are distinguishable with difficulty.

Leaves of mature plants entire, small to medium-sized.

Leaves deeply cordate to rounded or truncate at base, 10–13 cm. wide.....*M. acuminata.*

Leaves acute at base, 5–6 cm. wide.....*M. falcifolia.*

Leaves of mature plants with 1 to many perforations or with more or less interrupted margins, often large.

Leaves never regularly pinnatifid.

Spadix rarely as long as 5 cm.

Leaves oblong-lanceolate, slightly to moderately perforated. *M. obliqua.*

Leaves ovate, abundantly perforated.....*M. Killipii.*

Spadix usually 1 dm. long or longer.

Leaves acute at the rounded base.

Leaves acute or shortly and broadly acuminate.*M. pertusa.*

Leaves narrowly long-acuminate.....*M. dilacerata.*

Leaves cordate or at least truncate at base.

Divisions of the leaf extending halfway to midrib. *M. maxima.*

Divisions extending nearly to midrib.....*M. acreana.*

Leaves regularly pinnatifid, at least comparatively so.

Divisions of the leaf 4–6 cm. wide, broadly oblong.

Divisions at least twice longer than broad.

Few (2–4); peduncle much longer than the spadix. *M. peruviana.*

Several (4–6); peduncle about equal to or much shorter than the spadix.....*M. Spruceana.*

Divisions scarcely twice longer than broad....*M. latiloba.*

Divisions of the leaf 1–3 cm. wide.

Spadix usually 1 dm. long or longer.....*M. subpinnata.*

Spadix 8 cm. long or shorter.....*M. Uleana.*

Monstera acreana Krause, Notizbl. Bot. Gart. Berlin 6: 114. 1914.

Similar to *M. maxima*, but the leaves much more divided and the slender peduncles only 8–9 cm. long. Neg. 12176.

Loreto: Río Acre, *Ule 9212.*

Monstera acuminata C. Koch, Ind. Sem. Hort. Berol. App. 4. 1855; 99.

The only known Peruvian species with entire leaves, cordate to truncate at base.—In the juvenile state the leaves are closely appressed to tree trunks.

Loreto: Cerro de Canchahuayo (*Huber 1342*). Iquitos, *Killip & Smith* (det. Krause).—Huánuco: Posuso, 600 meters, *4583*. Ranging northward to Guatemala.

Monstera dilacerata C. Koch, Ind. Sem. Hort. Berol. App. 5. 1855; 110.

Most easily recognized by the narrowly acuminate tips of both the young and old leaves or of their segments; largest leaves 2.5–4 dm. long, 2–2.5 dm. broad, often smaller; peduncle about 1.5 dm. long, the yellow spathe little shorter; spadix 5–6 cm. long, sessile.—17. Neg. 12179.

Loreto: Leticia, *Williams 3044*. Iquitos, *Killip & Smith 27372* (det. Krause). Colombia to Central America.

Monstera falcifolia Engler, Bot. Jahrb. 37: 117. 1905; 101.

Petioles slender, 1–1.5 cm. long, obscurely vaginate nearly to the blade; blades oblique, acuminate, narrowly oblong, about 2 dm. long and 5 cm. wide or, in var. *latifolia* Krause, to 10 cm. wide; peduncle 5–6 cm. long; spathe oblong, shortly acuminate, 4 cm. long; spadix 2.5–3 cm. long.—Illustrated, loc. cit.

Junín: La Merced, 1,200 meters, *5743*.—Loreto: Río Nanay, *Williams 730*. Yurimaguas, *Williams 4662*. Iquitos, *Killip & Smith* (all det. Krause). Brazil; Bolivia.

Monstera Killipii Krause, Notizbl. Bot. Gart. Berlin 11: 614. 1932.

Similar to *M. obliqua* but the leaves becoming nearly 2 dm. broad and 3 dm. long; petioles to 2.2 dm. long; perforations numerous even to the leaf margins; peduncle 1 dm. long; spathe and spadix pale yellow, the latter 4 cm. long, few-flowered.—8a.

Loreto: Iquitos (*Killip & Smith 27372*).

Monstera latiloba Krause, Notizbl. Bot. Gart. Berlin 11: 615. 1932.

Leaves ovate-oblong, cuspidate-acuminate, 3–4.5 dm. long, about 2 dm. wide, pinnatifid with 3–4 broadly oblong lobes each side

of the midnerve; fruiting spadix orange.—Distinctive among species with pinnately divided foliage in the few and broad leaf divisions. —17a.

Loreto: Balsapuerto (*Killip & Smith 28421; 28620*).

Monstera maxima Engl. & Krause, Pflanzenr. IV. 23B: 107. 1908.

The only Peruvian species with distinctly cordate or rounded-truncate leaves that are irregularly laciniate; leaves 4–7 dm. long and 3–4 dm. broad, the short divisions broadly oblong, truncate and often slightly dilated at the apex; peduncles usually 1 dm. long or more; spathe oblong, to 3.5 dm. long.

Puno: Chunchosmayo, 900 meters, *Weberbauer 1182*.—Huánuco: Huamalíes, 700 meters, *Weberbauer 3602*.—San Martín: Tarapoto, *Williams 5673* (det. Krause).—Loreto: Río Acre, *Ule 9214*. Ecuador.

Monstera obliqua Miq. Linnaea 18: 79. 1844; 103.

Slender, climbing, with oblong-lanceolate, beautifully perforated leaves (or rarely the holes only 1 or 2); perforations often large; leaves about 2 dm. long.—The related *M. coriacea* Engler has a spadix 6 cm. long, spathe 8 cm. long, and longer leaves and petioles (to 3 dm.).—Illustrated, Mart. Fl. Bras. 3, pt. 2: *pl. 19*.

Junín: La Merced, 1,200 meters, *5812* (det. Krause).—Loreto: Río Itaya, *Williams 236* (det. Krause). Río Acre, *Ule 9204*. Brazil to the Guianas.

Monstera pertusa (L.) de Vriese, Hort. Spaarn. Bergens. 40. 1839; 103. *Dracontium pertusum* L. Sp. Pl. 968. 1753.

Very variable, but the leaves more or less cleft or perforated.—The Peruvian form is sometimes var. *Jacquinii* (Schott) Engler, with indistinctly auricled sheaths. Fruit orange (Klug).—Illustrated, Mart. Fl. Bras. 3, pt. 2: *pl. 20*.

Huánuco: Pampayacu (*Poeppig*). Tingo María, *Raimondi* (det. Krause).—Junín: La Merced, *5403*.—Loreto: Near Iquitos, *Klug 515*. Río Acre, *Ule 9242*. Brazil; Colombia.

Monstera peruviana Engler, Bot. Jahrb. 37: 117. 1905; 112.

Petioles narrowly vaginate; leaves fleshy-coriaceous, oblong, 4–5 dm. long and 2.5 dm. broad, their divisions 2–4; spadix 8–10 cm. long, greenish, much shorter than the peduncle. Neg. 12187.

Huánuco: On the Monzón, 1,000 meters, *Weberbauer 3575*.

Monstera Spruceana (Schott) Engler in Mart. Fl. Bras. 3, pt. 2: 115. 1878; 113. *Tornelia Spruceana* Schott, Oesterr. Bot. Zeitschr. 9: 40. 1859.

Petioles broadly vaginate, 3 to several dm. long; leaves to 3.5 dm. wide; peduncle stout, about 1 dm. long; spadix finally almost 3 dm. long or often a third shorter.—Spathe white; spadix orange (Tessmann).

Loreto: Santa Rosa, below Yurimaguas, *Killip & Smith.* Mouth of Río Santiago, *Tessmann 4522.* Río Acre, *Ule 9222* (all det. Krause).

Monstera subpinnata (Schott) Engler in DC. Monogr. 2: 267. 1879; 113. *Tornelia subpinnata* Schott, Prodr. 357. 1860.

Leaves 2.5–3.5 dm. long, with 3–6 divisions about 12 cm. long and 2–3 cm. wide; peduncle stout, 7–8 cm. long; spathe broadly ovate, 1 dm. broad when expanded, acuminate; spadix 10–12 cm. long, 16–20 mm. thick.—22.

Huánuco: Pampayacu (*Poeppig*).—Junín: La Merced, 1,000 meters, *Weberbauer 1873;* 282.—San Martín: Río Huallaga, *Williams 6582* (det. Krause).—Loreto: Yurimaguas, *Williams 4694* (vel aff., det. Krause; has the narrow leaf segments of *M. Uleana,* but sterile). Río Acre, *Ule 9239, 9230.*—Ayacucho: Río Apurímac Valley, *Killip & Smith 2249* (det. Krause).

Monstera Uleana Engler, Bot. Jahrb. 37: 118. 1905; 113.

Similar, but divisions 6–7, falcate, 1–2 cm. wide; peduncle 1 dm. long; spathe ovate-oblong, white, 5 cm. broad; spadix about 8 cm. long, 1.5 cm. thick.—Doubtfully distinct from *M. subpinnata.*

Loreto: Pampas de Ponasa, *Ule.*

4. SPATHIPHYLLUM Schott

Reference: Engler & Krause, Pflanzenr. IV. 23B. 1908.

Stemless or short-stemmed herbs with long-petioled ovate-oblong leaves, and peduncles about as long or longer, bearing a leaf-like persistent spathe. Spicular crystals few. Ovary 2–4-celled.

Petioles about 6 dm. long, nearly twice as long as the blades. *S. Huberi.*

Petioles about 2 dm. long, or about equaling the blades.

Leaves oblong-lanceolate.

Spadix 2–5 cm. long, the stipe 4–8 mm. long.

Leaves 4–5 cm. broad; spadix about 4 cm. long ..... *S. tenerum.*

Leaves mostly under 3 cm. broad; spadix 2–2.5 cm. long. *S. Lechlerianum.*

Spadix 7–12 cm. long, the stipe often 12–15 mm. long. *S. cannaefolium.*

Leaves broadly ovate-elliptic ..... *S. juninense.*

Spathiphyllum cannaefolium (Dryand.) Schott, Gen. Aroid. 1: 1. 1858; 132. *Pothos cannaefolia* Dryand. Bot. Mag. *pl. 603*. 1803.

Larger than the other species, the leaves sometimes several dm. long and 1 dm. wide or wider; sepals truncate.—25.

Loreto: Pebas, *Williams 1706* (det. Krause). Colombia; Venezuela; British Guiana.

Spathiphyllum Huberi Engler, Bot. Jahrb. 37: 120. 1905; 128.

Petioles narrowly vaginate to the middle; leaves oblong-lanceolate, acute at base, long-acuminate, 1.5 dm. broad, with very many lateral nerves; spathe green, acuminate, nearly 2 dm. long, 6 cm. broad; spadix stipe 3–3.5 cm. long; spadix 12 cm. long, 8 mm. thick; sepals free, subtruncate; ovary 2-celled, with 2 ovules in each cell near the base.—Illustrated, op. cit. 129.

Loreto: Cerro de Canchahuayo (*Huber 1403*).

Spathiphyllum juninense Krause, Notizbl. Bot. Gart. Berlin 11: 615. 1932.

Petioles about 4 dm. long, vaginate nearly to the node but very narrowly; leaves obtusely rounded at base, acuminate, 3 dm. long and about half as broad; primary lateral nerves 14–16; peduncle 6 dm. long; spathe white or green, oblong, 15 cm. long, the acumen about 1 cm. long; spadix 11 cm. long, the stipe nearly 2 cm. long.—6 a.

Junín: Santa Rosa, Pichis Trail, 800 meters, *Killip & Smith 26157*.

Spathiphyllum Lechlerianum Schott, Prodr. 425. 1860; 131.

Petioles very slender, 1.5 dm. long or longer, narrowly vaginate to about the middle; leaves narrowly lanceolate, narrowed at each end, long-acuminate, 2.5–4 cm. broad; primary lateral nerves 6–7; peduncle 3–4 dm. long; stipe 2 cm. long; spathe white, cuneately long-decurrent; sepals connate, 6-lobed; ovules 6–8 in each cell.

Puno: Sangabán (*Lechler*).—San Martín: Tarapoto (*Spruce 4496*).—Loreto: Camboso, *Ule*. Puerto Meléndez, *Tessmann 4837*.

Spathiphyllum tenerum Engler, Bot. Jahrb. 37: 120. 1905; 131.

Petioles long-vaginate; leaves thin, light green above, paler beneath, obtuse at base, acuminate, 1.5–2 dm. long, 3–4 cm. broad; primary lateral nerves about 9, strongly arcuate; peduncle about 4 dm. long; spathe 5–7 cm. long, the acumen 1–1.5 cm. long; stipe 4–5 mm. long; sepals free. Neg. 12197.

Loreto: Cerro de Ponasa, 1,200 meters, *Ule 6851*.

5. DRACONTIUM L.

The species known within Peru are distinguishable from the related genus *Urospatha* by their large dissected leaves. Members of the scarcely distinct genus *Cyrtosperma* Griff. will, no doubt, be found sooner or later in Peru. It is usually distinguishable from *Dracontium* by its hastate-sagittate leaves, although those of *C. Spruceanum* are 3-parted. The elongate spathe of *Cyrtosperma* is usually straight, the seeds albuminous, and the caudex short or tuberous.

Leaves irregularly pinnate; spathe green.....*D. loretense.*
Leaves 3-parted, the divisions pinnate; spathe white.....*D. Ulei.*

Dracontium loretense Krause, Notizbl. Bot. Gart. Berlin 11: 617. 1932.

Petioles unknown; leaves multiparted, the lateral divisions oblong or obovate-oblong, 1–1.5 dm. long, 4–6 dm. broad, the terminal deeply bilobed; spathe narrowly lanceolate, nearly 2.5 dm. long; spadix stipe about 1 cm. long, the spadix 4 cm. long, 12 mm. thick.—Similar to *D. costaricense* Engler but with different measurements, especially in the length of the spadix stipe. Other aroids known from Peru, for instance species of *Anthurium* and *Philodendron*, are similar to or identical with specimens collected in Costa Rica.—4a.

Loreto: In forest, Yurimaguas, Río Huallaga, *Williams 5144*.

Dracontium Ulei Krause, Notizbl. Bot. Gart. Berlin 6: 115. 1914.

Petioles minutely roughened, 4 dm. long or longer; leaves about 5 dm. long, deeply 3-parted, the primary divisions equally biparted, the others irregularly pinnate, the ultimate oblong-lanceolate segments 4–8 cm. long; peduncles 3–5 cm. long, 6–8 mm. thick; spathe incurved at the cucullate apex, 6 cm. long, spadix stipe very short,

the spadix 3–4 cm. long, 14 mm. thick; ovary incompletely 3–4-celled; fruit 4–5 mm. long.—In its white spathe unique. Neg. 12192.

Peru: Probably, but the type from São Francisco on the Alto Acre and Alto Xapury, Brazil, *Ule 9215*.

6. UROSPATHA Schott

Reference: Engler, Pflanzenr. IV. 23C. 1911.

The Peruvian species readily known by the greatly prolonged spathe, the caudate portion above the spadix 2–3 dm. long, or by the greatly prolonged lower leaf lobes, these equaling or longer than the upper ones.

Spathe elongate to 4.5 dm.

Lower leaf lobes ovate..... *U. caudata.*

Lower leaf lobes oblong-lanceolate..... *U. angusta.*

Spathe not elongate.

Midnerve of lower lobes exposed for 2–3 cm.... *U. Langsdorffiana.*

Midnerve of lower lobes exposed for about 1 cm.... *U. decipiens.*

Urospatha angusta Krause, Notizbl. Bot. Gart. Berlin 11: 616. 1932.

Petioles 3.5 dm. long; leaves subcoriaceous, narrowly hastate, about 4.5 dm. long and to 2.5 cm. wide at the base, the upper, oblong-lanceolate, acuminate lobe 2.8 dm. long; peduncle 3 dm. long; spathe deep green without, 2 dm. long; spadix reddish green, shortly stiped, 5 cm. long.—10a.

Loreto: Yurimaguas, 135 meters (*Killip & Smith 27965*).

Urospatha caudata (Poepp. & Endl.) Schott, Gen. Aroid. 1: 3. *pl. 8.* 1853; 34. *Spathiphyllum caudatum* Poepp. & Endl. Nov. Gen. & Sp. 3: 85. *pl. 296.* 1845.

A tall herb, the long-petioled leaves triangular-hastate, their lower lobes to 3 dm. long and 14 cm. wide, the upper lobe somewhat longer and nearly 2 dm. wide; spadix to about 1 dm. long.

Loreto: Mouth of Río Capanahua, *Tessmann 3031* (det. Krause). Brazil.

Urospatha decipiens Schott, Bonplandia 5: 128. 1857; 34.

Petioles 5–14 cm. long, verruculose-roughened below; leaves sagittate, to 4 dm. long but usually much smaller, the lobes about

equal in length, the upper broader, to 6 cm. broad; peduncle 1.5–9 cm. long; spathe 2.5–3 dm. long, the spadix as long or much shorter, its stipe 7–8 mm. long.

Loreto: Caballo-cocha, *Williams 2226* (det. Krause). Brazil.

Urospatha Langsdorffiana Schott, Oesterr. Bot. Wochenbl. 7: 253. 1857; 35.

Petioles and leaves often several dm. long, the petioles and peduncles slightly muriculate; lower leaf lobes to 3 dm. long, strongly oblique; spadix very shortly stipitate.—Spathe dark green, paler within, the spadix greenish pink (*Killip & Smith*).

Loreto: Yurimaguas, *Killip & Smith 27965* (det. Krause). Brazil.

7. ANTHURIUM Schott

Reference: Engler, Pflanzenr. IV. 23B. 1905.

Perennials, various in habit, but most often with short assurgent stems, less frequently scandent. Venation parallel. Spicular crystals lacking. Ovules solitary or two. Seeds albuminous.—There are upward of 100 Ecuadorian species, many of which may well be expected to occur in northern Peru, but mention of them even incidentally has seemed impractical. The recent discovery of *A. cuspidifolium* Schott, hitherto known only from Costa Rica, is a further indication of the probable incompleteness of the following list.

A. Leaves entire or essentially so.
  B. Petioles usually shorter than the leaf blades or the leaves neither cordately nor hastately lobed at base.
    C. Lower lateral nerves, at least, free to the margins or apparently so.
      Lateral nerves all or nearly all free.
        Peduncle and leaves subequal.....*A. tarapotense.*
        Peduncle much shorter than the leaves.
          Peduncle 2.5–3.5 dm. long.....*A. Tessmannii.*
          Peduncle about 1 dm. long.....*A. Ernesti.*
      Only the lower lateral nerves free.
        Leaves very rigid-coriaceous.
          Leaves ovate, not much longer than the petiole. *A. Weberbaueri.*
          Leaves oblong-lanceolate, much longer than the petiole.
            Leaves about 1 dm. wide or narrower..*A. Dombeyanum.*
            Leaves about 1.5 dm. wide or wider...*A. rigidissimum.*

Leaves thin or, if coriaceous, not rigid.

Leaves 2–7 cm. wide.

Spathe and spadix subequal; leaves 5–6 cm. wide. *A. tenuispadix.*

Spathe much shorter than the spadix; leaves narrower. *A. linearifolium.*

Leaves about 1–3.5 dm. wide.

Leaves small or medium-sized, the petioles 1.5–2 dm. long.

Leaves long-acuminate; petiole callus 1 cm. long. *A. cuspidifolium.*

Leaves acute; petiole callus 0.5 cm. long. *A. Uleanum.*

Leaves very large, the petioles to 4 dm. long. *A. latissimum.*

C. All the lateral nerves joined before the margin into a longitudinal nerve.

D. Leaves membranous or subcoriaceous, the intramarginal nerve remote.

Spadix distinctly stipitate, or the petioles and leaves subequal.

Stipe 3–3.5 cm. long..... *A. gracilipedunculatum.*

Stipe 0.5–2 cm. long.

Stipe 8 mm. long, or rarely obscure; petioles and blades usually subequal.

Leaves elliptic-lanceolate, 7–8 cm. wide. *A. amoenum.*

Leaves suboblong, 5–7 cm. wide..... *A. idmense.*

Stipe about 2 cm. long; petioles often much shorter than the blades..... *A. decurrens.*

Spadix sessile or subsessile, the petioles rarely equaling the blades.

Leaves linear-oblong, rarely 2.5 cm. wide, finally very many times longer than broad... *A. vittariifolium.*

Leaves usually broader, always only a few times longer than broad..... *A. scandens.*

E. Leaves not black-dotted; petioles usually several cm. long.

Leaves narrowly oblong-lanceolate, or broader (6–7 cm.) but distinctly calloused at the shortly cuneate base.

Spadix exceeding the spathe.

Leaves less than 2 cm. wide, rarely 1.5 dm. long. *A. gracile.*

Leaves usually 2.5 cm. wide and often longer (cf. also *A. linearifolium*).

Lateral nerves irregular, 5–10 mm. apart. *A. scolopendrinum.*

Lateral nerves parallel, 2–3 mm. apart. *A. gracillimum.*

Spadix and spathe subequal.....*A. huanucense.*

Leaves elliptic-obovate, often 1 dm. wide or, if oblong-lanceolate, long-decurrent on the obscurely calloused petiole.

Leaves 3.5–6 dm. long, 6 cm. wide above. *A. tenuispadix.*

Leaves generally much shorter and wider.

Petioles much shorter than the leaves.

Peduncles about twice longer than the petioles.....*A. oxycarpum.*

Peduncles many times longer than the petioles. *A. strictum.*

Petioles and blades subequal....*A. flavescens.*

E. Leaves black-dotted; petioles about 1 cm. long, deeply grooved.....*A. Pohlianum.*

D. Leaves heavy-coriaceous, the intramarginal nerve near the margin.....*A. Weberbaueri.*

B. Petioles usually about equaling, or exceeding, the distinctly cordate or hastate leaves.

F. Primary basal nerves (i.e. lobate nerves) few (3–5).

G. Leaves more or less deeply cordate at base.

H. Spathe about 2.5 cm. wide or narrower.

Spathe about 1 dm. long or longer.

Spathe about 1 (–1.5) dm. long; spadix stipitate (at least shortly).

Stipe 1.5–2 cm. long; leaves acuminate.

Basal sinus closed or partly closed. A. *corallinum.*

Basal sinus rounded, open, the lobes divergent. *A. carneospadix.*

Stipe about 5 mm. long; leaves shortly acute or obtuse.

Leaves acute, small, to 13 cm. wide. *A. indecorum.*

Leaves rounded at tip, to 2 dm. wide. *A. Lechlerianum.*

Spathe about 1.5–2 dm. long; spadix sessile.

Basal lobes roundish, 6–7 times shorter than upper, divergent, the sinus shallow. . *A. cainarachense.*

Basal lobes semiovate, about 4 times shorter than the upper, little divergent, the sinus deep. *A. huamaliesense.*

Spathe about 5 cm. long or shorter.

Leaves large, the basal sinus several cm. deep.

Lobal nerves 4; peduncle 2–2.5 dm. long. *A. terrestre.*

Lobal nerves 5; peduncle 1.5–2 dm. long. *A. sororium.*

Leaves small, the sinus 1.5–2 cm. deep. *A. oblongo-cordatum.*

H. Spathe about 6 cm. wide.

Spadix stipe less than 1 cm. long.

Leaves broadly cordate, 4 dm. wide at base. *A. consimile.*

Leaves sagittate-cordate, 2.5 dm. wide at base. *A. Schunkei.*

Spadix stipe 1.5 cm. long. . . . . *A. Macbridei.*

G. Leaves triangular-hastate, the lobes strongly divergent.

Apex of leaf rounded or obtuse or apiculate.

Leaves nearly 2 dm. wide at lobes; spadix stipitate. *A. peruvianum.*

Leaves nearly 1 dm. wide at lobes; spadix sessile. *A. nervosum.*

Apex of leaf shortly acuminate. . . . . *A. siccisilvarum.*

F. Primary lateral basal nerves 6–9.
Basal lobes divergent, the lobes often pandurate-hastate.
Basal lobes oblong or rounded but always widely spreading.
Leaf tip rounded or shortly acuminate.
Spathe linear-oblong, less than 1 cm. wide. *A. siccisilvarum.*
Spathe oblong, 2 cm. wide..... *A. breviscapum.*
Leaf tip 2 cm. long..... *A. huallagense.*
Basal lobes obliquely ovate and merely divergent.
Leaves 2.5–4 dm. broad.
Spadix stipitate..... *A. alienatum.*
Spadix sessile.
Spathe about 2.5 cm. wide..... *A. huamaliesense.*
Spathe about 1 cm. wide..... *A. cainarachense.*
Leaves about 1.5 dm. broad..... *A. indecorum.*
Basal lobes convergent, the leaves often cordiform.
Upper lobe obviously contracted at middle.. *A. Macleanii.*
Upper lobe little contracted, the leaf ovate-cordate.
Acumen conspicuous, 1.5 cm. long..... *A. lutescens.*
Acumen lacking or reduced to a cusp.... *A. monzonense.*

A. Leaves, at least some of them, more or less deeply dissected.
The principal divisions more or less lobed.
Peduncle about 6 dm. long, the spadix half as long. *A. Burchellianum.*
Peduncle about 3 dm. long, the spadix twice as long. *A. clavigerum.*
The principal divisions entire or merely repand.
Leaf segments 3.
Some of the leaves entire, the leaf or leaflets abruptly caudate. *A. yurimaguense.*
All the leaves divided, the leaflets acuminate.. *A. triphyllum.*
Leaf segments more than 3 in at least some leaves.
Leaf segments mostly 5–9 (3–13).
Spathe and usually the spadix less than 1 dm. long.
Peduncles and petiole subequal, 4 dm. long... *A. Martini.*
Peduncles a third to two-thirds as long as the petiole (1–2 dm.) or shorter.

Petioles 4-sided; segments (1.5–) 3–4 dm. long. *A. Kunthii.*

Petioles subterete; segments 1–2 dm. long.

Segments not very unequal at base. *A. pentaphyllum.*

Segments, in part, very unequal..... *A. undatum.*

Spathe and especially the spadix much more than 1 dm. long..... *A. Wittianum.*

Leaf segments 15–20..... *A. eminens.*

Anthurium alienatum Schott, Prodr. 507. 1860; 125.

Leaves cordiform, 5–6 dm. long, 3.5–4 cm. wide at the middle, the subovate basal lobes about a fourth as long, their lateral nerves 7, those of the upper lobe 13–15 and definitely joined near the margin; peduncle shorter than the leaves, about 5.5 dm. long; spathe reflexed, 5 cm. long; spadix stipe 1 cm. long, the spathe 6 cm. long.

Puno: Sangabán (*Lechler 2425*).—Cuzco: Valle de San Miguel, 2,000 meters., *Herrera 2038* (aff., det. Krause).—Huánuco: Panao, 3,000 meters, *2225* (det. Krause).—Loreto: Mouth of Río Santiago, *Tessmann 4112.*

Anthurium amoenum Kunth ex Schott, Prodr. 442. 1870; 107.

Petioles terete or sulcate, 1.5–3 dm. long; leaves pale green, punctate, oblong-lanceolate-elliptic, 1.5–2.5 dm. long, long-cuspidate-acuminate; lateral nerves 15–18, joined 5 mm. within the margin; peduncle 2–3 dm. long; spathe linear-lanceolate, acuminate, 4–5 cm. long, the sessile or subsessile spadix as long or shorter; sepals rose-purple.—The Peruvian plant is var. *humile* (Schott) Engler, with longer, long-acuminate, oblong leaves. Illustrated, Engler, Icon. Autog. 66.

Loreto: Near Iquitos, *Klug 316, 207* (det. Krause).—Huánuco: Pampayacu (*Poeppig*).—Puno: (*Lechler*). Venezuela; Colombia.

Anthurium breviscapum Poepp. & Endl. Nov. Gen. & Sp. 3: 84. 1845; 229.

Petioles about 3 dm. long; leaves 3–4 dm. long, 2–4 dm. broad below, arcuately narrowed to the middle, shortly acuminate, the divaricate basal lobes oblong; peduncles 2.5–3 dm. long; spathe 6–8 cm. long, 2 cm. broad, erect, oblong, acuminate, green; spadix 5–7 cm. long, 6–7 mm. thick, the stipe to 5 mm. long.

Huánuco: Pampayacu (*Poeppig 1511*). Near Cochero (*Poeppig*). —Puno: Sangabán (*Lechler*).

Anthurium Burchellianum (Engler) Macbr. Field Mus. Bot. 11: 7. 1931. *A. panduratum* Mart. var. *Burchellianum* Engler, Pflanzenr. IV. 23B: 279. 1905. *A. panduratum* Mart. ex Schott, Prodr. 545. 1860, not Schott, Oesterr. Bot. Zeitschr. 182. 1858.

Similar to *A. clavigerum*, but the leaf divisions often fewer and the petioles shorter; segments sinuately few-lobed or (in the Martius plant) deeply 2-lobed.—Leaves to 1 meter wide (Huber).—Illustrated, Mart. Fl. Bras. 3, pt. 2: *pl. 14*.

Loreto: Cerro de Canchahuayo (*Huber*). La Victoria, *Williams 2939*. Yurimaguas, *Williams 4630* (det. Krause). Brazil.

Anthurium cainarachense Engler, Pflanzenr. IV. 23B: 192. 1905.

Scandent, with thin leaves 6 dm. long and 3.5 dm. wide, the sinus rounded; peduncle slender; spathe long-acuminate, to 2 dm. long and 1.5 cm. wide; lateral basal nerves 4; spadix sessile, 2–2.5 dm. long, 7 mm. thick below, attenuate, reddish. Neg. 11876.

Loreto: Pongo de Cainarache, *Ule 6326*.

Anthurium carneospadix Engler, Pflanzenr. IV. 23B: 194. 1905.

Petiole equaling or a little exceeding the blade, 4–4.5 dm. long; blades oblong-cordate, the subreniform basal lobes about 3.5 times shorter than the upper; basal lateral nerves 6; peduncles 1.5 dm. long; spathe 1.5–3 cm. broad, purplish; spadix stipe 1.5–2 cm. long, the spadix finally 1 dm. long and 8 mm. thick; sepals red.—Perhaps not separable from *A. corallinum* Poepp. Neg. 11881.

Junín: East of Huácapistana, 2,300 meters, *Weberbauer 2115, 2271;* 250.—Cajamarca: Chugar, 2,700 meters, *Weberbauer 4080*.

Anthurium clavigerum Poepp. & Endl. Nov. Gen. & Sp. 3: 84. 1845; 280.

Scandent, with 9-parted leaves on petioles to 1 meter long; leaf divisions long-cuneate at base, the intermediate ones 5–6 dm. long and pinnatifid, free; peduncle only 3 dm. long; spadix twice longer than the spathe, 6–7 dm. long, the fruit purple.—Var. *subpedatipartitum* Engler has the leaf segments coherent below.

Huánuco: Cochero (*Poeppig*). Near the Monzón, 600 meters, *Weberbauer 3664;* 286.—Loreto: Yurimaguas, *Killip & Smith* (det. Krause). Río Acre, *Ule 9221*.

Anthurium consimile Schott, Oesterr. Bot. Wochenbl. 7: 294. 1857; 211.

Leaves broadly cordate, about 4 dm. wide below and only 5–5.5 dm. long; basal lobes oblique, a quarter as long; basal nerves 5; spathe long-cuspidate, 1.5 dm. long, the short-stipitate spadix 12 cm. long and 1 cm. thick.

Peru: (*Poeppig*).

Anthurium corallinum Poepp. & Endl. Nov. Gen. & Sp. 3: 84. 1845; 190.

Similar to *A. carneospadix;* petioles shorter; leaves with a point 2 cm. long; basal nerves 4; spadix stipe 1 cm. long; spathe linear-lanceolate.

Huánuco: Cochero (*Poeppig*).

Anthurium cuspidifolium Schott, Oesterr. Bot. Zeitschr. 180. 1858; 158.

Among Peruvian species most nearly allied to *A. flavescens,* but the petioles much shorter than the blades (about 1.5 dm. long), the blades oblong and to 1 dm. wide, the lower lateral nerves obscure, and the peduncle only 5–6 cm. long.

Junín: La Merced, 1,200 meters, *5622* (det. Krause). Chanchamayo Valley, 1,500 meters, *Schunke 572.* Costa Rica.

Anthurium decurrens Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 83. *pl. 293.* 1845; 93.

Stems short; leaves glaucous green, oblong-obovate, shortly and acutely acuminate, long-cuneate to base, to 2 dm. long and 5–6 cm. broad; lateral nerves 14–19; spathe abruptly apiculate, decurrent on the peduncle nearly to the middle, to 1 dm. long and more than 1 cm. broad; spadix 6 cm. long, 3–4 mm. thick, its thickened fruiting rachis violet, the fruits scarlet; stipe 2 cm. long.

Loreto: Yurimaguas (*Poeppig*); *Killip & Smith.* Puerto Arturo, *Killip & Smith 27928.*—Junín: Río Paucartambo Valley, *Killip & Smith* (all det. Krause).

Anthurium Dombeyanum Brongn. ex Schott, Prodr. 477. 1860; 81.

Leaves oblong-lanceolate, attenuate to the apex, green above, paler beneath, about 3.5 dm. long; peduncles shorter; spathe decurrent at base, 8–9 cm. long, 2–2.5 cm. broad; spadix about as long,

less than 1 cm. thick, shortly stipitate.—Illustrated, Saund. Ref. Bot. 4: *pl. 269.*

Junín: Stony shrubby places above Huacapistana, 1,800 meters, *Weberbauer 1975.*—Huánuco: Rock outcrops, Muña, *3668* (det. Krause).—Without locality (*Dombey*).

Anthurium eminens Schott, Oesterr. Bot. Wochenbl. 5: 273. 1855; 291.

Arborescent, about 2 meters high; leaf segments 4–6 dm. long, 1 dm. wide, lance-oblong, long-cuneate to the base, narrowed above to a lanceolate cuspidate point; intramarginal nerve 3–4 mm. remote; peduncle 2 dm. long; spathe red, the longer spadix 5 dm. long.—Imperfectly known.

Peru: Junction of the Huallaga and the Río de Chiechas (*Poeppig*).

Anthurium Ernesti Engler, Pflanzenr. IV. 23B: 80. 1895.

Stems short; petioles slender, to 2 dm. long, 5-carinate on the back, grooved above; lateral nerves of the leaves 7–8, ascending at an angle of 40 degrees; spathe white, to 2.5 cm. broad; spadix to 1.5 cm. thick; sepals linear; otherwise similar to *A. Tessmannii.* Neg. 11918.

Loreto: Falls of the Cainarache, *Ule 6325.* San Isidro, *Tessmann 4997* (det. Krause).—San Martín: Tarapoto, *Williams 5721* (det. Krause). Brazil.

Anthurium flavescens Poepp. in Poepp. & Engl. Nov. Gen. & Sp. 3: 83. 1845; 155.

Leaves obovate-elliptic, arcuately narrowed to the cuspidate tip and to the base, about 1.5 dm. long and 5 cm. broad, with 15–20 lateral nerves; peduncles 2–3 dm. long; spathe lanceolate, little decurrent, reflexed, 5 cm. long and 12 mm. wide; spadix sessile, white, 3.5 cm. long and 6–7 mm. thick.

Huánuco: Near Cochero (*Poeppig*). Pampayacu 1,050 meters, *5078* (det. Krause).—San Martín: Moyobamba, *Weberbauer 4726.*

Anthurium gracile (Rudge) Lindl. Bot. Reg. 19: *pl. 1635.* 1833; 89. *Pothos gracilis* Rudge, Pl. Guian. 1: 23. *pl. 32.* 1805.

Very much like *A. scolopendrinum* and with the same concolorous foliage, but the petioles always much shorter than the blades (to one-quarter their length), and the blades linear-lanceolate, narrowed to both ends, and long-acuminate.

Loreto: Mainas (*Poeppig); Killip & Smith* (det. Krause). San Isidro, *Tessmann 5030* (det. Krause). Ranging to the Guianas and Central America.

Anthurium gracillimum Engler, Pflanzenr. IV. 23B: 91. 1905.

A more or less scandent plant, in aspect like *A. scolopendrinum*, but the caudex elongate, the petioles definitely sheathed, and the lateral nerves very numerous and nearly parallel.

Loreto: Mishuyacu, near Iquitos, *Klug 1272* (det. Krause). Colombia.

Anthurium gracilipedunculatum Krause, Field Mus. Bot. 8: 78. 1930.

Scandent, the internodes 3–6 cm. long; petioles slender, vaginate at base, grooved above, 5–7 cm. long; blades thick, oblong-lanceolate, cuspidulate, 8–11 cm. long, 4 cm. broad; lateral nerves prominent beneath, joined 3–4 mm. from the margin; peduncles scarcely 5 mm. thick, often curved, 12–16 cm. long; spathe and spadix reddish, the former narrowly lanceolate, long-acuminate, 4–5 cm. long, 5 mm. wide, the spadix 4–7 cm. long, 3–4 mm. thick, on a stipe 3–3.5 cm. long.—Nearly *A. pulchellum* Engler, of Colombia, but differing in color and proportionate size of petioles, leaves, and spathes.

Huánuco: Yanano, 1,800 meters, sprawling on forest floor, *3734*, type.

Anthurium huallagense Engler, Pflanzenr. IV. 23B: 132. 1905.

A scandent epiphyte with short internodes and thin hastate leaves; petioles broadly grooved above; basal lobes divergent, oblong, obtuse, half shorter than the ovate-lanceolate long-acuminate upper lobe, the latter 2.5 dm. long and 1–2 dm. broad; peduncle about 2 dm. long; spathe linear, long-acuminate, 8–9 cm. long, 6–7 mm. wide; spathe 1.5–2 dm. long, 5 mm. thick, the stipe 3–6 mm. long; sepals purplish. Neg. 11943.

Huánuco: Near the Monzón, 600 meters, *Weberbauer 3660, 3661.*

Anthurium huamaliesense Engler, Pflanzenr. IV. 23B: 193. 1905.

Like *A. cainarachense;* petioles to 3.5 dm. long; leaves narrower, about 2.5 dm. wide; spathe finally 1.5 dm. long and 2.5 cm. broad; spadix 1 cm. thick, light brown. Neg. 11944.

Huánuco: Between the Monzón and the Huallaga, 600 meters, *Weberbauer 3666;* 286.—Junín: Paucartambo Valley and Pichis

Trail, *Killip & Smith* (det. Krause). La Merced, 1,200 meters, *5650*.

Anthurium huanucense Engler, Pflanzenr. IV. 23B: 165. 1905.

Petioles 4–7 cm. long; leaves pale green, cuneately narrowed to the base, acutish, 2.5 dm. long and 4–5 cm. broad; lateral nerves about 15; peduncle equaling the leaves; spathe linear, shortly acuminate, 5 cm. long, 6–7 mm. wide; spadix as long, 3 mm. thick; sepals reddish, white-punctate. Neg. 11945.

Huánuco: By the Monzón, 900 meters, *Weberbauer 3449*.—Junín: La Merced, *5650* (det. Krause).

Anthurium indecorum Schott, Oesterr. Bot. Zeitschr. 350. 1858; 246.

Allied to *A. Macleanii* but the leaves merely elongate-cordate, 3–3.5 dm. long, the retrorse basal lobes oblong, 7–8 cm. long; petioles 2.5–3 dm. long; peduncle 7–11 cm. long; spathe green, about 1 dm. long and 2 cm. wide; spadix 12 cm. long and 1 cm. thick, violet-purple.

Huánuco: Cochero (*Poeppig*). Casapí (*Mathews*).—Cuzco: Marcapata, 2,900 meters, *Weberbauer 7799* (det. Krause).—Piura: East of Huancabamba, *Weberbauer 6317*. Colombia.

Anthurium idmense Krause, Notizbl. Bot. Gart. Berlin 6: 608. 1932.

Among Peruvian species well marked by the thin, crowded, suboblong leaves about 5–7 cm. wide and 2 dm. long or somewhat longer, broadly narrowed to the shortly acuminate tip, shortly and broadly cuneate at base; petioles 1 dm. long or longer, the peduncles about as long; spadix slender, twice as long as the lanceolate spathe, this 4–5 cm. long; stipe 5–6 mm. long.—The entire plant dries reddish. Neg. 11948.

Cuzco: Hacienda Idma, Prov. Convención, 1,700 meters, *Weberbauer 5036*.

Anthurium Kunthii Poepp. & Endl. Nov. Gen. & Sp. 3: 84. 1845; 286.

Slender stems climbing; petioles (1–) 3–5 dm. long; leaf segments 5–13, elongate-lanceolate, cuneate at base and subabruptly acuminate at apex; lateral nerves joined to an intramarginal one; spathe purplish, narrow, 1.5 dm. long; spadix 3 cm. long in flower; berries globose, blue.—Illustrated, Pflanzenr. IV. 23B: 287.

Loreto: Caballo-cocha, *Williams 2408* (det. Krause). Pongo de Cainarache, *Ule 6330*. La Victoria, *Williams 2784* (det. Krause). Mainas (*Poeppig*). Cerro de Canchahuayo (*Huber*).—Puno: Sangabán (*Lechler*).—San Martín: Tarapoto, *Williams 6543, 6210* (det. Krause).—Cuzco: Prov. Calca (*Herrera*). Brazil.

Anthurium latissimum Engler, Pflanzenr. IV. 23B: 292. 1905.

Caudex short; petioles grooved above, carinate; leaves broadly oblanceolate, 5 dm. long and 3.5 dm. broad; lateral nerves about 12; peduncles somewhat 4-sided, 5.5 dm. long; spathe decurrent, lanceolate, 1 dm. long, 2.5 cm. wide; spadix subsessile, in fruit to 17 cm. long and 2 cm. thick. Neg. 11960.

Junín: La Merced, 1,000 meters, *Weberbauer 1939;* 282.

Anthurium Lechlerianum Schott, Prodr. 534. 1860; 261.

In general similar to *A. breviscapum;* petioles shorter; leaves abruptly rounded-obtuse at apex, retuse and minutely apiculate; spathe shorter, narrowly lanceolate; spadix to 1 dm. long and 1.5 cm. thick in fruit. Neg. 11961.

Puno: Sangabán (*Lechler 2203*). Cachicachi, *Weberbauer 1312a.* —Huánuco: South of Monzón, 1,600 meters, *Weberbauer 3513*— Junín: San Ramón, *5747* (det. Krause). Bolivia.

Anthurium linearifolium Engler, Pflanzenr. IV. 23B: 88. 1905.

Resembling greatly *A. scolopendrinum,* but a few of the lateral nerves near the leaf base to the margin or apparently so. Neg. 11966.

Loreto: Caballo-cocha, *Williams 2422* (det. Krause). Ranging northward to Colombia and Panama.

Anthurium lutescens Engler, Pflanzenr. IV. 23B: 293. 1905.

Petioles broadly and acutely grooved above, about 5 dm. long; leaves deeply cordate, 5 dm. long and 3.5 dm. wide below, the lobes 2.5 times shorter than the upper part of the leaf; peduncle angled, about 6 dm. long; spathe green, lanceolate, nearly 2 dm. long, 3.5 cm. wide; spadix sessile, 12 cm. long, 13 mm. thick at base.—Peduncle and sepals yellow-spotted, from a yellow crystal soluble in KOH and HNO_3. A similar plant collected by Killip and Smith near La Merced has a longer and slender, purple spadix and purplish spathe. Neg. 11976.

Huánuco: Pampayacu, 1,050 meters, *5084.*—Junín: La Merced, *Weberbauer 1838.*

Anthurium Macbridei Krause, Field Mus. Bot. 8: 79. 1930.

A magnificent plant allied to *A. corallinum;* petioles to 1.5 meters long; leaves elongate-cordiform, to 9 dm. long and 7 dm. broad, the upper lobe twice as long as the rounded lower ones; peduncle 6-8 dm. long, 1.5 cm. thick at base; spathe narrowly oblong, subacuminate, 1.5–2 dm. long, 4–6 cm. wide, the brownish purple spadix 2–3 dm. long or in fruit longer, on a stipe 1.5 cm. long.

Huánuco: Huacachi, near Muña, in woods, 2,150 meters, *4110*, type.

Anthurium Macleanii Schott, Oesterr. Bot. Zeitschr. 350. 1858; 250.

Well marked by the unusual shape of the leaves, the lower two-thirds rounded-ovate or almost round, the upper third oblong, the width between the two dissimilar parts nearly 3 dm.; basal lobes oblong-ovate, incurved; basal nerves 8; peduncle 2 dm. long; spathe and spadix 1.5 dm. long; spadix stipe 3-4 cm. long. Neg. 11977.

Huánuco: Yanano, *3764* (det. Krause). (*Maclean*).—Amazonas: Chachapoyas, *Weberbauer 4439*.

Anthurium Martini Schott, Oesterr. Bot. Wochenbl. 7: 325. 1857; 279.

Leaf divisions 7, 2 dm. long and 6 cm. wide, cuneate at base, the 2 outer connate, rounded or abruptly linear-cuspidate at apex, subrepand; spathe 2 dm. long, 1 cm. wide; spadix slender, 2.5 dm. long.

Loreto: Cerro de Canchahuaya (*Huber 1405*). Balsapuerto, *Killip & Smith.* French Guiana.

Anthurium monzonense Engler, Pflanzenr. IV. 23B: 264. 1905.

Caudex about 5 dm. long; petioles nearly 9 dm. long, vaginate for 5–6 cm; leaves ovate-cordate, about 6.5 dm. long and 4 dm. broad, the subovate basal lobes 4 times shorter than the upper; peduncle 5 dm. long; spathe coriaceous, oblong, green, nearly 1.5 dm. long, equaled by the brown sessile spadix.—Engler places this in his group *Cavispathacea*, characterized by purple spathes. Neg. 11996.

Huánuco: Monzón, 1,600 meters, *Weberbauer 3562*, type.

Anthurium nervosum Krause, Notizbl. Bot. Gart. Berlin 11: 608. 1932.

In aspect suggesting *A. peruvianum*, but much smaller, the leaves only 1.5–1.8 dm. long, on slender petioles 2–3 dm. long; peduncles

a little longer; spathe brownish green, oblong-lanceolate, 3.5 cm. long and scarcely 1 cm. wide, the spadix 4.5 cm. long, sessile or nearly so.—The one known plant was terrestrial. Neg. 12002.

Amazonas: Moyobamba, *Weberbauer 4648*.

Anthurium oblongo-cordatum Engler, Pflanzenr. IV. 23B: 110. 1905.

Scandent, the internodes long or short; petioles a few cm. to 1.5 dm. long; leaves sharply acuminate, at base lightly cordate, 1.5 dm. long and 6–7 cm. wide; peduncles exceeding the petioles; spathe 5 cm. long, 5–8 mm. wide, the slender spadix somwhat longer.

Amazonas: Moyobamba, *Weberbauer 4755*. Colombia.

Anthurium oxycarpum Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 83. 1845; 94.

Similar to *A. decurrens*, but the leaves scarcely cuspidate, the spathe shorter than the spadix, and the fruit violet.—*A. guayaquilense* Engler, with compressed petioles grooved above and 1 dm. long, will probably be found.

Loreto: Yurimaguas (*Poeppig*). Tierra Blanca, *Tessmann 4975*. Brazil.

Anthurium pentaphyllum (Aubl.) G. Don in Sweet, Hort. Brit. ed. 3. 633. 1839; 290. *Dracontium pentaphyllum* Aubl. Pl. Guian. 2: 837. *pl. 326*. 1775.

Resembling *A. Kunthii*, but leaf segments fewer, 5–9; spathe green, reflexed; fruits green.

Junín: La Merced, 1,000 meters, *5564*, *5679* (det. Krause); *Weberbauer 1866*, *1874*; 282; *Schunke 330* (det. Krause).—Loreto: Cuillacaca, Río Huallaga (*Huber 1544*). Yurimaguas, *Williams 4191* (det. Krause). Iquitos, *Klug 514* (det. Krause). Brazil to British Guiana and Trinidad.

Anthurium peruvianum Engler, Pflanzenr. IV. 23B: 262. 1905.

A close ally of *A. Lechlerianum*, differing chiefly in the fewer nerves and more widely spreading, narrower basal lobes. Neg. 12034.

Puno: Above Cachitachi, 1,800 meters, *Weberbauer 1312*, type.

Anthurium Pohlianum Engler, Pflanzenr. IV. 23B: 152. 1905.

Among Peruvian species with all the lateral nerves joined, this plant resembles most *A. scandens*, from which its short caudex

readily distinguishes it; petioles scarcely 1 cm. long, grooved above; blades about 1.5 dm. long and 3 cm. wide, apiculate at the scarcely acute or rounded apex and little narrowed to the base; peduncles about 3 cm. long, bearing a spadix 3–4 cm. long in a spathe half as long and about 1 cm. wide.

Tumbes: Hacienda Chicama, 1,000 meters, *Weberbauer 7632, 7632a* (det. Krause). Brazil.

Anthurium rigidissimum Engler, Pflanzenr. IV. 23B: 292. 1905.

Much more robust than *A. Dombeyanum*, the larger glaucescent leaves more strongly narrowed to the base; spathe green, to 1.5 dm. long; spadix nearly as long or, in var. *mutatum* Engler, the spathe foliaceous and to 3.5 dm. long and the spadix to 2.5 dm. long. Neg. 12058.

Junín: Above Huacapistana, 2,000 meters, *Weberbauer 2007, 2158*.—Cuzco: Valle de San Miguel, *Herrera 2034* (det. Krause).

Anthurium scandens (Aubl.) Engler in Mart. Fl. Bras. 3, pt. 2: 78. 1878; 57. *Dracontium scandens* Aubl. Pl. Guian. 2: 836. 1775.

Well marked among Peruvian species with a definite intramarginal nerve by its scandent habit, short petioles a fifth to half as long as the ovate-lanceolate blades, and shortly peduncled and short spadix.—Var. *latifolium* Krause has roundish leaves 6–7 cm. wide. Var. *angustifolium* (Engler) Macbr. (f. *angustifolium* Engler) is a striking variant with leaves 8-9 cm. long and only 1–2 cm. wide. *A. trinerve* Miq. is very similar to *A. scandens*, but the peduncles usually well exceed the petioles.—Illustrated, Pflanzenr. IV. 23B: 57.

Puno: Sangabán (*Lechler 2464*).—Junín: La Merced, *4249, 5746*. Chanchamayo Valley, 1,500 meters, *Schunke 374, 373*.—Cuzco: Quispicanchi, *Weberbauer 7845*.—Loreto: Puerto Meléndez, *Tessmann 4765*.—Amazonas: Moyobamba, *Weberbauer 4644*. Brazil to Central America and the West Indies.

Anthurium Schunkei Krause, Field Mus. Bot. 8: 77. 1930.

Caudex and petioles stout, the latter about 2.5 dm. long; leaf blades glabrous, sagittate, subcoriaceous, to 4 dm. long and 2.5 cm. broad, triangular and shortly acuminate above, the basal lobes rounded, the sinus broad; lateral nerves 4–5 from the base, above about 8–10; peduncles 3.5 dm. long, 12 mm. thick at base, narrowed to below the spathe, there enlarged; spathe narrowly oblong, acu-

minate, 1.5 dm. long, to 3.8 cm. broad, drying brownish; spadix narrowly cylindric, 1.4 dm. long, 6–9 mm. thick, on a stipe 7–8 mm. long; sepals obtuse.—Allied to *A. cabrerense* Engler, a species with an elliptic-lanceolate spathe.

Junín: Chanchamayo Valley, *Schunke 293*, type.

Anthurium scolopendrinum (Ham.) Kunth, Enum. 3: 68. 1841; 89. *Pothos scolopendrinus* Ham. Prodr. 16. 1825.

Very near *A. vittariifolium*, but the leaves as green on one side as on the other, and the nerves about equally prominent on both sides except that the reticulate veins are more noticeable beneath.—The var. *contractum* Engler has leaves contracted above the base, 12–15 cm. long, 4–5 cm. broad, on petioles 6–8 cm. long. The var. *Poiteauanum* (Kunth) Engler is the broad-leaved form.—Illustrated, Pflanzenr. IV. 23B: 90.

Junín: Chanchamayo Valley, 1,200–1,500 meters, *Schunke 890, 1464*. La Merced, *Schunke 382* (det. Krause).—Huánuco: Monzón, *Weberbauer 3628;* 286.—Loreto: La Victoria, *Williams 2924*. Near Iquitos, *Williams 8147* (det. Krause).—San Martín: Tarapoto, *Williams 6657*. Moyobamba, *Weberbauer 4483*. Brazil to Trinidad and Costa Rica. "Uvo."

Anthurium siccisilvarum Krause, Field Mus. Bot. 8: 78. 1930.

Assurgent, the internodes 3–5 cm. long; petioles grooved above, 3.5–4.5 dm. long, 5–7 mm. thick at base, the node 1.5 cm. long; leaves thick, hastate, 3 dm. long or longer, the spreading oblong rounded basal lobes 5–6 cm. wide, the upper lobe obovate-lanceolate, narrower toward base; lateral nerves many, joined near the margin; peduncles 2–3 dm. long; spathe linear-oblong, little decurrent, acute, 6–7 cm. long, 7–8 mm. broad, the narrow spadix 3–4 mm. longer, on a stipe 1.5 cm. long.—Between rocks in dry woods. Similar to *A. denudatum* Engler of Colombia, with the upper leaf lobe lanceolate, not narrowed at base.

Huánuco: Muña, 2,300 meters, *4048*, type.

Anthurium sororium Schott, Prodr. 522. 1860; 198.

Caudex ascending; petioles 2–3 dm. long, the suboblong blades about 2.5 dm. long and 12 cm. broad, the oblong basal lobes incurved and 7 cm. long; spathe broadly lanceolate, long-acuminate, 4 cm. long, 1.5 cm. wide; spadix slender, short-stiped, 6 cm. long. Neg. 12079.

Huánuco: Near the Monzón, 600 meters, *Weberbauer 3612;* 285.—Junín: La Merced, *5719* (det. Krause).—Loreto: Mainas (*Poeppig*).

Anthurium strictum N. E. Br. in DC. Monogr. 2: 638. 1879; 75.

A pale green plant with thin blades 2–3 dm. long and about 6–10 cm. wide at the middle, shortly acuminate, rather long-cuneate below to a petiole 2–6 cm. long; peduncles slender, somewhat shorter than the leaves; spathe and sessile spadix subequal, both green or white, about 5 cm. long (longer in Peruvian material). Neg. 12085.

Loreto: Yurimaguas, *Killip & Smith 28014* (det. Krause). Río Acre, *Ule 9223*. Brazil.

Anthurium tarapotense Engler, Pflanzenr. IV. 23B: 74. 1905.

Petioles 3 times shorter than the leaves, rounded on the back and flat above; leaves broadly oblong-lanceolate, very acute, about 4.5 dm. long and 1.5 dm. broad; spathe linear-lanceolate, nearly 6 cm. long and 1 cm. wide, lurid red; spadix a little longer, attenuate.—*A. Uleanum* Engler, loc. cit. (Juruá Miry, *Ule 5731*), is related, but the leaves are long and cuneately narrowed, the base itself subobtuse, and the spathe and spadix are 1–3 dm. long, the latter the longer. Neg. 12095.

San Martín: Tarapoto, *Ule*.

Anthurium tenuispadix Engler, Pflanzenr. IV. 23B: 73. 1905.

Related to *A. tarapotense* but foliage very similar to *A. oxycarpum;* petioles grooved above, 5–10 cm. long; leaves elongate-oblanceolate, to 4 dm. long and 6 cm. broad.—In all probability within Peru. Neg. 12099.

Brazil: Juruá Miry, *Ule 5597*.

Anthurium terrestre Engler, Pflanzenr. IV. 23B: 196. 1905.

Like *A. sororium*, but the broader leaves 1.5–2 dm. wide, with a broad sinus; spathe to 5 cm. long and 1 cm. wide; spadix subsessile, 1 dm. long, 5 mm. thick.—*A. amazonicum* Engler, op. cit. 194 (*Ule 5599*, Juruá Miry), would be sought here. It is near *A. carneospadix*, but has oblong-sagittate leaves and a spadix stipe 4–5 mm. long. Neg. 12100.

Loreto: Yurimaguas, *Ule 6308*.

Anthurium Tessmannii Krause, Notizbl. Bot. Gart. Berlin 9: 260. 1925.

An epiphyte; petioles 2–2.2 dm. long, 1–1.2 cm. thick, vaginate for one-fifth their length; blades thin-coriaceous, lanceolate, shortly and broadly acuminate, subcuneately narrowed for a third of the length toward a subobtuse base, 5–6 dm. long, 2 dm. wide, or larger, the lateral nerves about 10, prominent; peduncle asperate below, 1 cm. thick; spathe green, linear-lanceolate, about 1 dm. long, to 1.5 cm. broad; spadix pale red, scarlet-lilac in fruit, 1 to nearly 2 dm. long, 6–10 mm. thick; sepals oblong, obtuse; ovary oblong-ovoid.—Near *A. Uleanum*. Neg. 12101.

Loreto: Cumaría on the upper Ucayali, *Tessmann 3351*. Caballo-cocha, *Williams 2465* (det. Krause).

Anthurium triphyllum Brongn. ex Schott, Prodr. 548. 1860; 285.

The only known species with all the leaves trifid.—Illustrated, Pflanzenr. IV. 23B: 286.

Puno: Isilluma, 1,000 meters, *Weberbauer 1212*. Bolivia.

Anthurium Uleanum Engler, Pflanzenr. IV. 23B: 74. 1905.

Caudex short; petioles 1–1.5 dm. long; leaves lanceolate, acute, long and narrowly cuneate to base, several dm. long and 1–1.5 dm. wide; peduncles twice as long as the petioles or longer; spathe oblong-lanceolate, usually 1–1.5 dm. long, much exceeded by the sessile or subsessile spadix. Neg. 12109.

Loreto: Cumaría, *Tessmann 3350*(?). Brazil.

Anthurium undatum Schott, Melet. 1: 22. 1832; 288.

Similar to *A. pentaphyllum*, but the shorter and narrower segments very unequal.—Illustrated, Engler, Icon. Autog. 301.

Huánuco: Near the Monzón, *Weberbauer 3691*. Brazil.

Anthurium vittariifolium Engler, Pflanzenr. IV. 23B: 88. 1905.

Petioles rounded dorsally, plane above; leaves 6–15 cm. long, acute at base, narrowed to apex, to 3 cm. wide; intramarginal nerve 2–2.5 mm. remote from the margin; peduncle 2–3 cm. long; spathe linear-lanceolate, 5 cm. long, 5 mm. wide; spadix 1.5 dm. long. Neg. 12116.

Junín: La Merced, *Weberbauer 1892*. Brazil.

Anthurium Weberbaueri Engler, Pflanzenr. IV. 23B: 81. 1905.

Related to *A. Dombeyanum*, but the much shorter leaves about 2 dm. long, obtuse at base, greenish yellow beneath, exceeded by the

peduncle, this 4–4.5 dm. long; spathe 5–6 cm. long, 1.5 cm. broad, equaled by the thick spadix, this 18 mm. broad in fruit. Neg. 12219.

Puno: Sandía, 2,200 meters, *Weberbauer 543*.

Anthurium Wittianum Engler, Bot. Jahrb. 40: 143. 1907, nomen.

From other species with several leaflets distinguishable at once by the greatly elongate spadix and spathe, the former 2–4 dm. long, the latter 1.5–3 dm.—The spathe has been recorded as purple or green; the spadix as pink or purple. Neg. 12121.

Loreto: Yurimaguas, *Killip & Smith 28294*. Mouth of Río Santiago, *Tessmann 3985*.

Anthurium yurimaguense Engler, Notizbl. Bot. Gart. Berlin 11: 613. 1932.

Distinctive in its almost round, deeply cordate leaves, to 17 cm. wide, abruptly caudate-acuminate; petioles about 2 dm. long; spathe 2 cm. long, the spadix nearly 3 cm. long; peduncle about 1 cm. long. Neg. 12125.

Loreto: Yurimaguas, *Ule 6307*.

88. DIEFFENBACHIA Schott

Reference: Engler, Pflanzenr. IV. 23Dc. 1915.

Low, thick-stemmed, shrub-like or prostrate plants with more or less vaginate petioles and oblong leaves with many lateral nerves. Peduncles shorter than the leaves. Spathe persistent, a little longer than the spadix, which furnishes the most easily recognizable character for the genus in the remoteness of the flowers, particularly the sterile ones.—Besides the following, the widely distributed and highly variable *D. Seguina* (L.) Schott and *D. picta* (Lodd.) Schott probably occur. The former in general resembles *D. olbia*, but the leaves are lustrous glaucescent beneath. It is questionable if many of the plants recognized as species are more than races. The leaves of some, chewed, result in speechlessness for a time, due to swelling of the mouth.

Petioles, at least the upper, vaginate nearly to the blade base.

Petioles less than 1 dm. long.

Leaves elongate-lanceolate; peduncles 5–6 cm. long. *D. cannifolia.*

Leaves obovate-oblong; peduncles finally about 1 dm. long. *D. obliqua.*

Petioles 2 to 2.5 dm. long..... *D. macrophylla.*

Petioles vaginate for a quarter to two-thirds their length.

Petioles half as long as the blades or less than half as long.

Petioles usually 1–1.5 dm. long and blades always 2–6 dm. long.

Leaves 1.5–3 dm. wide.

Leaves lustrous green above, yellow-green beneath. *D. imperialis.*

Leaves spotted with yellow and white..... *D. olbia.*

Leaves 5–10 cm. wide.

Leaves elliptic-lanceolate, rounded-obtuse or rounded-acutish at base..... *D. Weirii.*

Leaves lanceolate-oblong, basally more or less cuneate-acute. *D. humilis.*

Petioles 5–8 cm. long and blades only 1.5 dm. long.. *D. gracilis.*

Petioles equaling or longer than the leaves.

Leaves about 1 dm. wide.

Spathe about 1 cm. wide, long-acuminate..... *D. Weberbaueri.*

Spathe 3–4 cm. wide, acuminate..... *D. humilis.*

Leaves about 2–3 dm. wide.

Leaves distinctly cordate..... *D. cordata.*

Leaves cuneate at base..... *D. costata.*

Dieffenbachia cannifolia Engler, Pflanzenr. IV. 23Dc: 40. 1915.

Caudex to 2 meters long; blades 3.5–4.5 dm. long, four times longer than the petioles, to 1.5 dm. wide, cuneately narrowed to base and subabruptly and shortly acuminate; primary lateral nerves about 12, prominent beneath; spathe pale green, 1.5 dm. long, the open part 2.5 cm. broad, cuspidate-acuminate; spadix white, the stipe 1 cm. long, the pistillate portion 5 cm. long, the sterile 1.5 cm., the staminate 4.5 cm. long.—Illustrated, op. cit. 41.

Loreto: Leticia, *Ule 6183.*

Dieffenbachia cordata Engler, Bot. Jahrb. 37: 135. 1905; 58.

Petioles vaginate to above the middle, about 4 dm. long and equaling the opaque blades; blades oblong-ovate, cordate at base, acuminate; primary lateral nerves 20–25; peduncles 2 dm. long; spathe elongate-lanceolate, not constricted, over 2 dm. long; spadix

short-stiped, the pistillate portion 1 dm. long, the shorter staminate portion separated.

Junín: La Merced, 1,000 meters, *Weberbauer 1807*.

Dieffenbachia costata Klotzsch ex Schott, Syn. Aroid. 128. 1856; 44.

Stout, the caudex to over 1 meter high and 5 cm. thick; petioles narrowly vaginate to the middle or higher; leaves rigid, pale green, not at all lustrous, ovate or broadly elliptic, oblique, 3.5–4 dm. long, merely acute; lateral nerves 9–15; spathe 2–3 dm. long, the expanded part 2.5–3 cm. broad with an acumen 1.5 cm. long; spadix sessile, under 2 dm. long, the pistillate part 6–8 cm., the staminate 5–6 cm., the sterile 3–4 cm. long.—A native remedy for rheumatism; a warmed leaf is applied. The sap is used as a skin astringent (*Weberbauer*).—Illustrated, Pflanzenr. IV. 23 Dc: 37.

Huánuco: Posuso (*Ruiz*).—Amazonas: Moyobamba, 800 meters, *Weberbauer 4583*. Colombia. "Patquina".

Dieffenbachia gracilis Huber, Bol. Mus. Goeldi 4: 540. 1906; 59.

Slender, densely clothed with the leaf sheaths; sheaths 2–3 cm. long, with round, scarious-margined auricles; petioles slender, 3–5 cm. long; blades oblong-obovate, falcate-acuminate, decurrent at base to the petiole, about 1.5 dm. long and 3.5–4 cm. broad; peduncle in fruit deflexed, the spadix 3 cm. long, the spathe thin, pale green.

Loreto: Leche, Pampa del Sacramento, *Huber 1536*.

Dieffenbachia humilis Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 90. 1845; 59.

Similar to *D. cordata*, but petioles vaginate scarcely to the middle, the blades green and white-variegated, acute at base, and spathe and spadix shorter.—Illustrated, Pflanzenr. IV. 23Dc: 58.

Loreto: Yurimaguas (*Poeppig 2401*). Brazil.

Dieffenbachia imperialis Lind. & André, Ill. Hort. *pl. 85*. 1871; 54.

Stout, with petioles to 6 dm. long, broadly vaginate to the middle, the edges white and rugose; blades thick, except for the pale midrib, intense green splotched with yellow, obtuse or subcordate at base, shortly acuminate, the lateral nerves 14–15.

Peru: (*Barraquin*).

Dieffenbachia macrophylla Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 90. 1845; 42.

Differs from *D. costata* most obviously in its oblong-ovate, considerably larger leaves with 12–15 prominent lateral nerves.

Huánuco: Cochero (*Poeppig 1559*). Posuso, 600 meters, *4662* (det. Krause).

Dieffenbachia obliqua Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 90. 1845; 42.

Resembles *D. cannifolia*, but the leaves 3–3.5 dm. long and scarcely 1.5 dm. wide, the lateral nerves about 15, and the pistillate portion of the spadix about 7 cm. long.

Loreto: Mainas, *Poeppig*. Puerto Meléndez, *Tessmann 4793* (det. Krause).

Dieffenbachia olbia Lind. & Rod. Ill. Hort. 39: 31. *pl. 148*. 1892; 52.

Inflorescence unknown, but apparently related to *D. imperialis*, from which species its ovate-lanceolate green leaves with numerous yellowish spots and dots appear to distinguish it.

Peru: (Introduced into cultivation in 1890).

Dieffenbachia Weberbaueri Engler, Bot. Jahrb. 37: 135. 1905; 57.

A slender plant with oblong, opaque blades, deep green above; petioles vaginate about a quarter of their length; blades obtuse at base, acute, 2.5–3 dm. long; lateral nerves about 15; spathe elongate-lanceolate, 1.5 dm. long, the tip 1 cm. long; spadix stipitate, the pistillate and staminate parts 6 cm. long.

Huánuco: Prov. Huamalíes, *Weberbauer 3634*.

Dieffenbachia Weirii Berkl. Journ. Hort. Soc. n. ser. 1: 201. 1866; 54.

Petioles half as long as the greenish and white or yellowish-spotted blades, and vaginate half their length; blades elliptic or oblong-lanceolate, 6–8 cm. broad; lateral nerves about 10; spathe pale green, 7 cm. long, the tip 6–8 mm. long; spadix stipe 4 mm. long. —Illustrated, Pflanzenr. IV. 23Dc: 55 (flower).

Peru(?): Buenaventura (*Wallis*).

9. PHILODENDRON Schott

Reference: Krause, Pflanzenr. IV. 23Db. 1913.

Usually scandent, with great variation in foliage. Staminate flowers below in part sterile. Spathe usually colored, at least below, persistent. Ovary 2–many-celled, the ovules many and laterally attached or few and near the base.—The monotype *Phylonotion Spruceanum* Schott may occur. It has a 1-celled ovary and a solitary ovule and is recognizable by the spadix, which has a much thinner, i.e., strongly contracted, sterile portion 2 cm. long. Also *Thaumatophyllum Spruceanum* Schott, with pedately dissected leaves, peculiar because the upper staminate portion of the spadix is produced as a naked conical appendage. Both these curious plants have been found but once, but in adjacent Amazonian Brazil. Huber has recorded the native name "moronga" for some unidentified species of *Philodendron*, and Williams the name "patquina." The following key, as in *Anthurium*, attempts to account for most species, but only for the single specimens by which mostly they are known and not for probable variations, especially in matters of size. There are undoubtedly many more species, as yet uncollected or undescribed.

A. Leaves entire, never definitely cordate or hastate (compare also *P. variifolium*).

Petioles conspicuously vaginate and usually for more than half their length.

Petioles 2–10 cm. long, rarely 10 cm. long.

Petioles 2–3.5 cm. long and acutely vaginate about half their length; pistil with a curved beak . . . . . *P. longistilum.*

Petioles 3–10 cm. long, often vaginate to the leaf base; pistil short or straight.

Leaves distinctly herbaceous, 5–9 cm. long . . . *P. pteropus.*

Leaves firm or coriaceous, 1–2.5. dm. long.

Scarcely at all oblique, the lateral nerves ascending.

Leaves ovate, the lateral nerves not prominent. *P. guttiferum.*

Leaves oblong-lanceolate, the lateral nerves prominent. *P. Tessmannii.*

Strongly inequilateral, the lateral nerves subhorizontal.

Leaves oblong, 3–6 cm. wide . . . . . *P. chanchamayense.*

Leaves ovate-oblong, 9–10 cm. long . . *P. heteropleurum.*

Petioles 1–3 dm. long.

Leaves 10–28 cm. wide, rounded, truncate, or subcordate at base.

Leaves 15–28 cm. wide, the nerves spreading . . . *P. alatum.*

Leaves 10–12 cm. wide, the nerves ascending . *P. divaricatum.*

Leaves 5–8 cm. wide, subacute at base or, if wider, cuneate to base.

Leaves 2–4 dm. long, the primary nerves 8–14.

Spathe about 5 cm. long . . . . . *P. leucanthum.*

Spathe about 1 dm. long . . . . . *P. acreanum.*

Leaves 5.5 dm. long, the primary nerves about 20. *P. acutifolium.*

Petioles not conspicuously vaginate or only at base, sometimes winged.

Petioles 1 dm. long or usually shorter and leaves 1 dm. broad or usually narrower.

Leaves ovate-elliptic, about 1 dm. wide and 2 dm. long. *P. membranaceum.*

Leaves oblong-lanceolate or pandurate, proportionately narrower.

Leaves pandurate, to 3 dm. long and 7 cm. wide, on winged petioles 8 cm. long . . . . . *P. angustialatum.*

Leaves oblong-obovate-lanceolate, not constricted, or the petioles not wing-margined.

Principal lateral nerves few, 7–14.

Leaves cuneate at base, acuminate . . . . . *P. juninense.*

Leaves subpandurate, abruptly acuminate.

Petioles 1–1.5 dm. long . . . . . *P. heterophyllum.*

Petioles 3–7 cm. long . . . . . *P. elaphoglossoides.*

Principal lateral nerves many, nearly equally distinct.

Petioles vaginate for at least a third their length.

Leaves dull; primary nerves not marked. *P. longistilum.*

Leaves lustrous; primary nerves obvious. *P. chanchamayense.*

Petioles vaginate at base for scarcely 1 cm. *P. basivaginatum.*

Petioles 12 cm. long or usually longer and leaves usually broader, 8–18 cm. or wider.

Lateral nerves very numerous, equally distinct but obscure.

Petioles fleshy, not winged.

Leaves 8–12 cm. wide, 4–6 dm. long.... *P. stenophyllum.*

Leaves 14–18 cm. wide or wider, 6–7 dm. long or longer. *P. Ruizii.*

Petioles narrowly winged, vaginate below.... *P. cruentum.*

Lateral nerves 7–12 (the principal ones).

Peduncle 2–6 cm. long.

Leaves truncate at the subpandurate base.

Nerves 10–12; leaves rarely 10 cm. wide or 3 dm. long. *P. heterophyllum.*

Nerves 7–9; leaves to 13 cm. wide and 3.5 dm. long. *P. Uleanum.*

Leaves never subpandurate.

Leaves cuneate to base..... *P. juninense.*

Leaves broadly rounded at base..... *P. divaricatum.*

Peduncle 2–3 dm. long..... *P. fibrillosum.*

A. Leaves definitely cordate or sagittate at base or some of them at least deeply lobed or dissected.

B. None of the leaves divided, sometimes sagittately lobed at base.

C. Leaves often shorter than 3 dm. and few if any longer than 3.5 dm.

Leaves not cordate but oblong-sagittate or deltoid.

Leaves deltoid, the upper and lower lobes subequal. *P. deltoideum.*

Upper lobe much longer than the lower.

Lower lobes about 5 cm. long..... *P. variifolium.*

Lower lobes much longer..... *P. deflexum.*

Leaves cordate, at least at base, sometimes shallowly.

Leaves only 4 cm. wide and 4 times longer... *P. Mathewsii.*

Leaves 6–20 cm. wide.

Petioles not wing-margined.

Petioles shortly vaginate.

Leaves shallowly cordate.

Peduncles 2–3 cm. long; spathe pale. *P. variifolium.*

Peduncles 4–5 cm. long; spathe green or red below.

Petioles to 7 dm. long; leaves caudate. *P. Poeppigii.*

Petioles to 2.5 dm. long; leaves cuspidate. *P. Killipii.*

Leaves deeply cordate..... *P. densivenium.*

Petioles vaginate about one-third their length. *P. Bertae.*

Petioles wing-margined to the blade base. *P. Lechlerianum.*

C. Leaves often longer than 5 dm. and never or rarely shorter than 3.5 dm.

Pistillate portion of the spadix about one-third as long as the staminate.

Primary lateral nerves rib-like.

Secondary nerves very indistinct..... *P. maximum.*

Secondary nerves conspicuous..... *P. megalophyllum.*

Primary lateral nerves not rib-like, scarcely prominent.

Basal lobes not widely divaricate.

Petioles lightly verruculose..... *P. Muschlerianum.*

Petioles smooth..... *P. tarmense.*

Basal lobes widely divaricate.

Leaves not caudate-acuminate..... *P. deflexum.*

Leaves caudate-acuminate..... *P. Poeppigii.*

Pistillate portion of the spadix about one-half as long as the staminate, or subequaling it or even longer.

Lateral primary nerves above the basal lobes 8–13.

Lateral nerves more or less prominent but not rib-like.

Basal lobes not widely spreading.

Basal lobes longer than broad, to 4 dm. long. *P. maculatum.*

Basal lobes scarcely longer than broad, 6 dm. long. *P. Devansayeanum.*

Basal lobes widely spreading..... *P. deflexum.*

Lateral nerves prominent and rib-like. *P. megalophyllum.*

Lateral nerves above the base lobes 4–7.

Petioles densely setose..... *P. discolor.*

Petioles smooth.

Basal lobal nerves joined, 5–7.

Spathe nearly 2 dm. long..... *P. huanucense.*

Spathe a few cm. long..... *P. Weberbaueri.*

Basal lobal nerves partly distinct, about 3. *P. cordatum.*

B. At least some of the leaves divided.

Earlier leaves all elongate-lanceolate, entire, the later trifid; spathe and spadix subequal..... *P. micranthum.*

Most or all leaves lobed or divided, if trifid, the spathe much longer than the spadix.

Leaf divisions 3.

Leaf divisions subpinnate, the larger about 1.5 dm. wide. *P. latilobum.*

Leaf divisions trifid, the divisions 4–7 cm. wide. *P. tripartitum.*

Leaf divisions 5–10.

Lobes 5..... *P. quinquelobum.*

Lobes about twice as many..... *P. distantilobum.*

Philodendron acreanum Krause, Pflanzenr. IV. 23Db: 22. 1913.

Similar to *P. cruentum*, but the petioles long-vaginate or margined, the spathe white or yellowish, its tube 3–4 cm. long, and the ovary cells many-ovuled. Neg. 12198.

Loreto: Río Acre, *Ule 9213, 9238.*

Philodendron acutifolium Krause, Notizbl. Bot. Gart. Berlin 11: 617. 1932.

Petioles thick, vaginate, 1.5 dm. long; leaves lustrous, scarcely inequilateral, elongate-oblanceolate, to 12 cm. wide, gradually narrowed to base, acuminate with acumen nearly 3 cm. long; peduncle stout, about 1 dm. long, 5–6 mm. thick; spathe 9 cm. long; pistillate inflorescence in fruit ellipsoid, 5–5.5 cm. long, the subclavate staminate 3–4 cm. long.—37a.

Junín: Puerto Bermúdez. 375 meters (*Killip & Smith 26578*).

Philodendron alatum Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 87. 1845; 15.

A vigorous high-climbing plant, the caudex often 5–6 cm. thick; petioles 2.5–3 dm. long, vaginate, 2–3 cm. wide; leaves rounded to the shortly cuspidate tip, 2.5–3.5 dm. long; primary nerves 10–14, widely spreading; peduncle very short; spathe tumid, greenish yellow; fruit red.—*P. macropodum* Krause is distinguishable by its narrowly (to 1.5 cm. wide) vaginate petioles only 1–1.5 dm. long.

Huánuco: Pampaycu (*Poeppig 1298*).—San Martín: Moyobamba, *Weberbauer 4630*(?).

Philodendron angustialatum Engler, Bot. Jahrb. 37: 131. 1905; 92.

Upper internodes to 1 dm. long; leaves truncate or very slightly cordate at base, abruptly short-acuminate; primary nerves about 9; peduncles 3–4 cm. long; spathe white, oblong, 5 cm. long; spadix rose-color, the stipe 6 mm. long, the pistillate part 5 cm., the staminate nearly 6 cm. long; ovules solitary.—*P. pulchellum* Engler (Juruá Miry, *Ule 5728*) is similar but the leaves are less pandurate and the petioles are terete above. Both species illustrated, Pflanzer. IV. 23Db: 92, 93.

Huánuco: Near the Monzón, 600 meters, *Weberbauer 3589*.

Philodendron basivaginatum Krause, Notizbl. Bot. Gart. Berlin 11: 619. 1932.

Internodes 12–15 cm. long; petioles 4–5 cm. long; leaves oblong, 15–17 cm. long, 7–7.5 cm. wide, the slightly oblique acumen about 1 cm. long; peduncle 2–3 cm. long; spathe 5–6 cm. long; pistillate inflorescence slightly attenuate, about 3 cm. long, nearly 1 cm. thick, the staminate narrowly clavate, 2.5 cm. long or longer.—Only the juvenile spadix known.—28a.

Loreto: Iquitos (*Killip & Smith 27424*).

Philodendron Bertae Krause, Pflanzenr. IV. 23Db: 48. 1913.

Leaves deeply cordate-sagittate, the upper lobe about 3 dm. long and nearly as wide, with a tip 2.5 cm. long, the roundish basal lobes about 1 dm. long and broad; upper lateral nerves 7–8; peduncles 1 dm. long, 6–8 mm. thick; spathe light brown, the ovoid tube 5–6 cm. long, to 2 or 2.5 cm. broad, the blade 12 cm. long, with a cusp nearly 4 cm. long, to 3 dm. broad; spadix sessile, the pistillate part 4.5 cm. long, the staminate over twice as long; ovules many.—*P. Ernesti* Engler, allied to *P. Lechlerianum*, may be found in Peru.

It has shorter petioles vaginate to above the middle, shorter leaves, shortly cuspidate, and a stipitate spadix (*Ule 5770*, Juruá Miry). Neg. 12206.

Loreto: Río Acre, *Ule 9218*.

Philodendron chanchamayense Engler, Bot. Jahrb. 37: 125. 1905; 13.

Very well marked by its oblong one-sided leaves, one side being half to two-thirds wider than the other, the total width 3.5–5.5 cm.; peduncles 2.5–3 cm. long; spathe green, 8–9 cm. long; spadix yellow, shortly stiped; pistillate inflorescence nearly twice shorter than the staminate.—Illustrated, Pflanzenr. IV. 23Db: 14. Through an error, the specific name appeared originally as *chinchamayense*.

Junín: Chanchamayo Valley, *Weberbauer 1864*.

Philodendron cordatum (Vell.) Kunth, Enum. 3: 52. 1841; 82. *Arum cordatum* Vell. Fl. Flum. 9: *pl. 111*. 1827.

Petioles slender, sulcate above; leaves elongate oblong-cordate, 3–4 dm. long and half as wide; lobes semi-oblong, 8–10 cm. long, to 7 cm. wide, introrse; peduncle 2–3 cm. long; spathe tube 4–7 cm. long; pistillate spadix 4–5 cm. long, half as long as the staminate.

Loreto: Pampas de Ponasa, *Ule*. Brazil.

Philodendron cruentum Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 86. 1845; 30.

Petioles 1.5–2 dm. long, subterete, flat above; leaves rigid, elliptic-oblong, shortly cuspidate, narrowed to base, somewhat oblique, 3–4 dm. long and 8–10 cm. broad; peduncles in 2's, 3–4 cm. long; spathe about 1.5 dm. long, white without, beautifully red within, the tube 5–6 cm. long, the blade to nearly 1 dm. long, with a slender cusp 7–8 mm. long; spadix subsessile; ovules 2. Neg. 12213.

Huánuco: Cochero, *Poeppig 1561*.—Junín: La Merced, *5528* (det. Krause).

Philodendron deflexum Poepp. ex Schott, Syn. 101. 1856; 87.

Perhaps the earlier name for *P. Muschlerianum*, but very imperfectly known; basal lobes of the leaves oblique, oblong, 1.5 dm. long and 1 dm. wide, about 4 times shorter than the gradually narrowed upper lobe; lateral basal nerves 4–5 cm. long; lateral upper nerves 10–12, arcuate at the margins; secondary nerves oblique. Neg. 12216.

Huánuco: Pampayacu (*Poeppig 1281*).

Philodendron deltoideum Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 87. 1845; 35.

Petioles subterete, shortly vaginate, 1.5–2 dm. long; leaves 1–1.5 dm. long and nearly as broad, the oblong basal lobes spreading, nearly horizontal, 5–7 cm. long and 3.5–4 cm. wide; peduncles 3–4, 2–3 cm. long; spathe 3–3.5 cm. long, whitish, the narrow tube and blade subequal; spadix sessile, 3 cm. long, the pistillate inflorescence 2–3 times shorter than the staminate.

San Martín: Tocache (*Poeppig 2029*).

Philodendron densivenium Engler, Bot. Jahrb. 37: 132. 1905; 94.

Leaves lustrous, the basal lobes 4–6 cm. long and nearly as wide, 5–6 times shorter than the strongly arcuate, acuminate terminal one; basal nerves 3, lateral 4–5, secondary many, little oblique; spathe yellowish, turning reddish brown, 6 cm. long, little longer than the peduncle and shortly stiped spadix; pistillate inflorescence 2.5–3 cm. long, the staminate 4 cm. long; pistil 6–7-celled; ovule 1.—Illustrated, Pflanzenr. IV. 23Db: 95. *P. Traunii* Engler, related to *P. Bertae*, might be sought here. Its leaves are very shallowly cordate and the ovules many. Also *P. scabrum* Krause, with rough petioles, primary nerves scarcely distinguishable, and peduncles 2–3 cm. long; and *P. arcuatum* Krause with widely divaricate basal lobes, 8 cm. broad.

Puno: Above Cachicachi, 1,800 meters, *Weberbauer 1308*.—Huánuco: Near Monzón, 2,400 meters, *Weberbauer 3425*.

Philodendron Devansayeanum Linden, Ill. Hort. 42: 376. *pl. 48*. 1895; 65.

Similar to *P. maculatum*, but the petioles longer, to 6.5 dm., the leaves subrotund; peduncles twice as long and stouter, and the spathe bright red with white edges. Neg. 12218.

Peru: (Introduced into cultivation in 1894).

Philodendron discolor Krause, Notizbl. Bot. Gart. Berlin 9: 273. 1925.

High-climbing, with numerous adventitious roots; petioles strong, round, 3–5 dm. long, densely red-brown-setose; leaves herbaceous, lustrous above, the nerves a paler green, beneath purple, ovate-cordate, 3–4.5 dm. long, to 3.5 dm. broad, the rounded lobes incurved over the narrow subrotund sinus and more than twice as long as the acuminate blade; peduncles 1 dm. long or longer, setose, nearly 1

cm. thick; spathe fleshy, red-brown, sparsely fibrous, 1.5 dm. long; pistillate inflorescence 7 cm. long and 2 cm. wide, the staminate subclavate, about 5 cm. long, 1–1.3 cm. thick; pistil 5–6 mm. long, the stigma little impressed.—Near *P. verrucosum*, but petioles and leaves different. Neg. 12219.

Junín: Río Pantachuelo, 1,500 meters, *Weberbauer 6663*.

Philodendron distantilobum Krause, Pflanzenr. IV. 23Db: 115. 1913.

Leaves ovate-oblong, pinnately parted, with 5–6 spreading linear-lanceolate acuminate segments, 3–5 cm. distant, the intermediate about 1.5 dm. long and 4 cm. wide; peduncles 1 dm. long or longer, a little longer than the greenish white spathe; ovules many, attached a little above the base.—Related are *P. angustisectum* Engler and *P. elegans* Krause, with shorter peduncles, the former with a spathe under 1 dm. long and the latter with one over 1.5 dm. long. Also *P. laciniatum* (Vell.) Engler, distinguished by its fewer, more or less incised, and broader divisions and few ovules. Neg. 12220.

Loreto: Río Acre, *Ule 9236, 9228*.

Philodendron divaricatum Krause, Notizbl. Bot. Gart. Berlin 11: 618. 1932.

Upper internodes 5–10 cm. long; petioles often widely divaricate from the caudex, 12–16 cm. long; leaves 18–26 cm. long, ovate-oblong or ovate, broadly and obtusely rounded at base, distinctly inequilateral, shortly acuminate; primary nerves 8–10, prominent beneath; peduncle 4–5 cm. long; spathe 8–10 cm. long; pistillate inflorescence 3–3.5 cm. long, the staminate little longer.—22a.

Junín: La Merced (*Killip & Smith 24007*). Pichis Trail, 1,100 meters (*Killip & Smith 25986*). Loreto: Puerto Arturo, *Williams 5136*.

Philodendron elaphoglossoides Schott, Syn. 80. 1856; 91. *P. heterophyllum* Poepp. var. *elaphoglossoides* Engler in Mart. Fl. Bras. 3, pt. 2: 132. 1878.

Perhaps better treated as a variety of *P. heterophyllum;* nerves 12–14; spathe white, 6–8 cm. long; pistillate inflorescence 3–3.5 cm. long, the staminate little longer; pistil 5–6-celled.

Loreto: Yurimaguas, *Ule 6306; Williams 3961*. Leticia, *Ule 6186*. Santa Rosa, *Williams 3827* (det. Krause). Río Acre, *Ule 9219*. Brazil.

Philodendron fibrillosum Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 86. 1845; 42.

Differs from *P. juninense* Engler in its elliptic leaves only about twice longer than broad, longer peduncles, greenish spathe, purple at base, 6–8 cm. long, and 5-celled pistil.—*P. Wittianum* Engler has petioles 2 dm. long, oblong-lanceolate leaves 6 dm. long, and a spathe 1.5 dm. long.

Huánuco: Pampayacu to Cochero (*Poeppig*).

Philodendron guttiferum Kunth, Enum. 3: 51. 1841; 11.

Internodes short, the lower to 5 cm. long; petioles obtusely vaginate nearly to the blade base; blades ovate, acute, 5–8 cm. broad, the 8–10 primary nerves little pronounced; peduncles 1–2 cm. long; spathe to 1 dm. long, cusped; pistillate inflorescence about a third as long as the staminate; ovules mostly in 4 series.—Very similar is *P. ochrostemon* Schott, with pistillate inflorescence only a third shorter than the staminate.—Illustrated, Pflanzenr. IV. 23Db: 12.

Loreto: Yurimaguas (*Poeppig 2292*). Iquitos, *Ule 6907*. Brazil to Costa Rica.

Philodendron heterophyllum Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 86. *pl. 297*. 1845; 89.

Petioles terete, 1–1.5 dm. long; leaves very variable, oblong to obovate, more or less narrowed at base, truncate or narrowed to apex but long-cusped (1.5–2 cm.), 1.5–2.5 dm. long, to 8 cm. broad; nerves 10–12; peduncles often geminate, 2–5 cm. long; spathe greenish white, sometimes purplish at base, 5–6 cm. long; pistillate inflorescence scarcely 2 cm. long, the staminate twice as long; pistil 4-celled.

Huánuco: Cochero (*Poeppig 1560*).—San Martín: Tocache (*Poeppig 1968*).—Loreto: Yurimaguas, *Williams 3864*. Santa Rosa, *Williams 4902*.

Philodendron heteropleurum Krause, Notizbl. Bot. Gart. Berlin 11: 618. 1932.

Internodes extremely short; petioles 7–10 cm. long, the blades twice as long or longer; primary nerves 7–9, spreading, prominent beneath; peduncle about 1.5 cm. long, nearly 1 cm. thick; spathe 1.5 dm. long, cuspidulate, cylindrical; pistillate inflorescence 6–7 cm. long, equaled by the slenderer, conical staminate.—20a.

Loreto: Yurimaguas (*Killip & Smith 28034*).

Philodendron huanucense Engler, Bot. Jahrb. 37: 127. 1905; 66.

Petioles vaginate for about a third their length; blades cordate-triangular, about 5.5 dm. long and 3.5 dm. broad, with a rounded open sinus; peduncles 1 dm. long; spathe green, 2 dm. long; spadix stipe 1 cm. long; pistillate inflorescence 6 cm. long, the staminate 8–9 cm. long; ovary 5-celled. Neg. 12229.

Huánuco: Near the Monzón, 600 meters, *Weberbauer 3647*.

Philodendron juninense Engler, Bot. Jahrb. 37: 126. 1905; 42.

Stipules fibrous; petioles 7–10 cm. long, narrowly vaginate; blades thin, lanceolate, acuminate, narrowed to base, 3–3.5 dm. long; peduncles 3–4, 4–6 cm. long; spathe white, 4–5 cm. long; pistillate inflorescence a little shorter than the staminate; pistil 3-celled. Neg. 12232.

Huánuco: Pampayacu to Cochero (*Poeppig*).—Junín: *Weberbauer 1823*.

Philodendron Killipii Krause, Notizbl. Bot. Gart. Berlin 11: 620. 1932.

Upper internodes 6–8 cm. long; leaves ovate-cordate, about 3 dm. long, to nearly 2.5 dm. broad, the sinus broad, the lower lobes semi-ovate, 9–12 cm. long, the upper ovate, about 2.5 dm. long, shortly and obliquely cuspidate-acuminate; primary nerves of the upper lobe remote, 5–6; peduncle 4 cm. long; spathe oblong, 8–9 cm. long; pistillate inflorescence 3 cm. long, the staminate nearly 5 cm. long.—Separated by the author from *P. tarmense* Engler by the more widely cordate-based leaves with much more remote lateral nerves.—112a.

Junín: Hacienda Schunke, 1,500 meters (*Killip & Smith 24602*).

Philodendron latilobum Schott, Syn. 104. 1856; 105.

Leaves coriaceous, ovate-triangular, rounded-subtruncate at base, 3 dm. long and nearly as wide, the middle lobe broadly ovate, acute, 2 dm. long, the lateral obtuse; lateral nerves thick, spreading, about 6, alternating with the secondary nerves in the lateral lobes; inflorescence unknown.—The primary leaves are entire or subentire.

Loreto: Mainas (*Poeppig*); *Williams 5332*.—San Martín: Tarapoto, *Williams 5755* (primary leaves; det. Krause).

Philodendron Lechlerianum Schott, Prodr. 250. 1860; 45.

Leaves elongate-sagittate, gradually narrowed to the acute tip, deeply cordate at base, about 2 dm. long and 12 cm. wide, the semiorbicular basal lobes 2.5–3 cm. long and 5–6 cm. broad; upper nerves 3–4, 2 of the 3 basal ones shortly united; peduncle 6–8 cm. long; spathe tube 4 cm. long, the apiculate blade a little longer; spadix sessile, the pistillate inflorescence about 2 cm. long, the staminate more than twice as long; pistil elongate, 4–5-celled, the ovules biseriate.—*P. pulchellum* Engler might be sought here; see *P. angustialatum* Engler. Neg. 12234.

Puno: (*Lechler*). Bolivia.

Philodendron leucanthum Krause, Pflanzenr. IV. 23Db: 18. 1913.

Similar to *P. alatum* but much more slender; petioles 1–13 cm. long, 12–16 mm. wide, vaginate; blades about 2 dm. long, obliquely acuminate; primary nerves 8–10; peduncle nearly 3 cm. long; spathe white. Neg. 12288.

Loreto: Río Acre, *Ule 9231*.

Philodendron longistilum Krause, Pflanzenr. IV. 23Db: 127. 1913.

Slender; petioles acutely vaginate a third to a half their length, shallowly grooved, 2–3.5 cm. long; blades oblong-lanceolate, rounded to a cuspidate apex, acute at base, 1–2 dm. long, 3.5–6 cm. broad; nerves numerous; peduncle 12–18 cm. long; spathe 4–5 cm. long; spadix shortly stiped, about 5 cm. long; pistil obovoid, truncate, with a long, deeply excavate stigmatic beak.—Unique in its pistillate development. *P. decurrens* Krause would be sought here on vegetative characters. It is well marked by its elongate leaves that are practically sessile by the long decurrence of the blade.

Loreto: Río Acre, *Ule 9210*.

Philodendron maculatum Krause, Pflanzenr. IV. 23Db: 64. 1913.

Petioles terete or flattened toward the apex, 2.5 dm. long; leaves ovate, broadly cordate at base, acuminate, to nearly 3 dm. broad; rounded basal lobes about 1 dm. long; upper nerves about 10; peduncle 3–4 cm. long; spathe white with purple spots, 1 dm. long; spadix stipe nearly 1 cm. long, the pistillate inflorescence 4 cm., the staminate 5 cm. long. Neg. 12240.

Loreto: Río Acre, *Ule 9004*.

Philodendron Mathewsii Schott, Bonplandia 7: 29. 1859; 94.

Similar to *P. angustialatum*, but the petioles terete, the shorter and narrower leaves distinctly cordate at base and not pandurate, the spathe and the subsessile spadix each about 3 cm. long.—Illustrated, Pflanzenr. IV. 23Db: 93.

Huánuco: Casapí (*Mathews*).

Philodendron maximum Krause, Pflanzenr. IV. 23Db: 49. 1913.

Resembles *P. Bertae*, but the petioles much longer, the leaves much larger, to 9 dm. long, and undulate-margined about the deeply cordate base, and the spathe and spadix shorter.—*P. myrmecophyllum* Engler, allied to *P. Weberbaueri*, would be sought here. Its mature leaves are 4 dm. long and 3 dm. broad, with an open broad sinus, and the ovules are solitary.—Illustrated, loc. cit.

Loreto: Río Acre, *Ule 9229*.

Philodendron megalophyllum Schott, Prodr. 279. 1860; 87.

Like *P. deflexum* except as indicated, and perhaps a robust form, to 1.5 meters high; petioles stout; basal lobes oblong, subextrorse, rounded, to nearly 3 dm. long and 1.5 dm. broad, about half as long as the upper lobe; lateral upper nerves 12–13; inflorescence white, 14 cm. long, the staminate portion about 8 cm. long.

Puno: Sangabán (*Lechler 2495*).—Huánuco: Monzón, *Weberbauer 3643*.—Loreto: Mishuyacu, near Iquitos, *Klug 1519, 245* (det. Krause).

Philodendron membranaceum Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 87. 1845; 19.

Petioles narrowly margined; blades rounded at base, subacute; peduncle a little shorter than the petiole; spathe convolute to the middle, acute, 1 dm. long, yellowish; staminate and pistillate inflorescences very unequal in length and thickness; pistil 5-celled.—Not known to Engler and Krause, and relationship not determined.

Huánuco: Cochero (*Poeppig*).

Philodendron micranthum Poepp. ex Schott, Oesterr. Bot. Wochenbl. 5: 17. 1855; 36.

Petioles slender, terete, broadly vaginate at base, to 3 dm. long; primary leaves elongate-lanceolate, long-acuminate, those of the peduncles trifid, acute, the middle division to 3 dm. long and 1 dm.

wide, the lateral narrower and shorter; peduncles 4–7 cm. long; spathe white, about as long; pistillate inflorescence twice shorter than the staminate.—Illustrated, Pflanzenr. IV. 23Db: 37.

Loreto: Mainas, *Poeppig 2300*. Río Acre, *Ule 9216*. Brazil.

Philodendron Muschlerianum Krause, Pflanzenr. IV. 23Db: 50. 1913.

Apparently similar to *P. deflexum;* petioles slender, to 5 dm. long, verruculose-asperous, especially above; peduncles 2–3 cm. long; spathe white, 12 cm. long; spadix stipe 8 mm. long; pistillate inflorescence 3 cm. long, the staminate 3 times longer; ovules many. Neg. 12246.

Loreto: Río Acre, *Ule 9226*.

Philodendron Poeppigii Schott, Syn. 84. 1856; 50.

Petioles to 7 dm. long, often shorter; blades shallowly and unequally cordate, caudate-acuminate, about 2 dm. long, 8 cm. wide, or finally twice or even thrice as large; basal nerves 3–4, the primary lateral ones 6–7; peduncles 4–5 cm. long; spathe reddish below, about 1 dm. long.—Flowers white, rose-dotted (Klug). Neg. 12257.

Loreto: Mishuyacu, near Iquitos, *Klug 1508* (det. Krause). Brazil.

Philodendron pteropus Mart. ex Schott, Syn. 77. 1856; 6.

Differs from *P. guttiferum* in its shorter petioles, to 4.5 cm. long, narrower blades, to only 4 cm. broad, and numerous lateral nerves; inflorescence unknown. Neg. 12258.

San Martín: Tocache, *Poeppig 1948*. Brazil.

Philodendron quinquelobum Krause, Pflanzenr. IV. 23Db: 111. 1913.

Petioles terete, to about 3 cm. long; terminal lobe of the ovate-oblong blade subrhombic, acuminate, to 1 dm. long and 6.5 cm. broad, the lateral narrower, the basal broader; peduncles 7–12 cm. long; spathe whitish, about 1 dm. long; pistillate inflorescence more than half as long as the staminate.—The similar *P. squamiferum* Poepp. (Illustrated, Pflanzenr. IV. 23Db: 112) has densely red-scaly petioles.

Loreto: Río Acre, *Ule 9217*.

Philodendron Ruizii Schott, Oesterr. Bot. Wochenbl. 4: 418. 1854; 29.

Petioles about 2 dm. long and 1 cm. thick; blades oblong-lanceolate, contracted below, with the midnerve at base very thick; spathe to 1 dm. long; pistillate inflorescence 4–5 cm. long, subequaling the staminate; pistil elongate, 6-celled, the ovules 2, basifixed.—*P. Buchtienii* Krause is similar but the leaves are about 2.5 dm. wide and the pistil is 4–5-celled. Neg. 12265.

Huánuco: Posuso, *Ruiz.* Pampayacu (*Poeppig 1297*).

Philodendron stenophyllum Krause, Pflanzenr. IV. 23Db: 29. 1913.

Very much like *P. Ruizii* except for its narrower leaves and 8–9-celled pistil, with 2–4 ovules in each cell.—Illustrated, op. cit. 25. *P. Paxianum* Krause is yet another variant of this group of closely related "species," with leaves to 4 dm. long and 9 cm. wide and a 4–6-celled ovary with solitary ovules.

Huánuco: Monzón, 900 meters, *Weberbauer 3448.*

Philodendron tarmense Engler, Bot. Jahrb. 37: 128. 1905; 66.

Closely related to *P. huanucense* and similar, but the sinus of the leaves narrow and partially closed; peduncle 4–5 cm. long, the spathe twice as long; pistillate inflorescence 2 cm. long, the staminate 6–7 cm. long.—Illustrated, Pflanzenr. IV. 23Db: 67. *P. Brandtianum* Krause, allied to *P. Bertae*, has petioles 5 dm. long, peduncles 2.5 cm. long, and pistillate inflorescence 2.5 cm. long. *P. Poeppigii* Schott, closely related to *P. maximum*, has long petioles, an open leaf sinus, and spathe red below. Neg. 12273.

Junín: La Merced, 1,000 meters, *Weberbauer 1907.*

Philodendron Tessmannii Krause, Notizbl. Bot. Gart. Berlin 11: 617. 1932.

Internodes 5–7 cm. long; petioles 6–8 cm. long, very narrowly vaginate to the node; blades little oblique, to 2 dm. long, 7–8 cm. broad, the 9–10 primary nerves marked; peduncles 3–4 cm. long; spathe light green, 1 dm. long, acuminate; pistillate inflorescence 3 cm. long, the staminate 5 cm. long.—Compared by the author to *P. chanchamayense* Engler.—19a.

Loreto: Mouth of the Santiago (*Tessmann 3940*).

Philodendron tripartitum (Jacq.) Schott, Wien Zeitschr. 3: 780. 1829; 107. *Arum tripartitum* Jacq. Hort. Schoenbr. 2: 33. 1797.

Petioles terete, thick, 2–3 dm. long; leaf divisions subequal, 1.5–2.5 dm. long, cuspidate; peduncles solitary, 3–5 cm. long; spathe

twice as long; spadix stipe 2–4 cm. long; pistillate and staminate inflorescences subequal; ovary 7–11-celled, the ovules 1 or 2.—Illustrated, Pflanzenr. IV. 23Db: 108. Almost surely within Peru.

Brazil: Juruá Miry, *Ule 5792*. Brazil to Central America and Jamaica.

Philodendron Uleanum Engler, Bot. Jahrb. 37: 131. 1905; 89.

Similar to *P. heterophyllum*, but the leaves longer and broader, to 13 cm. wide, the peduncles 6 cm. long, the spathe longer, and the ovary 6–7-celled.—Illustrated, Pflanzenr. IV. 23Db: 90. Neg. 12275.

Loreto: Río Acre: *Ule 9211*. Brazil.

Philodendron variifolium Schott, Syn. 100. 1856; 36.

Imperfectly known, but apparently a close relative of *P. deltoideum*, from which it differs chiefly in its elongate leaves but these very variable, cordate-, hastate-, or sagittate-oblong, 2–2.5 dm. long, 6–7 cm. broad, with a cusp 1–1.5 cm. long; basal lobes very short and obtuse, or elongate-oblong, the sinus open.—*P. quitense* Engler, of Guayaquil, has longer petioles, broader leaves, and spreading basal lobes.

Huánuco: Pampayacu (*Poeppig 1281*).

Philodendron Weberbaueri Engler, Bot. Jahrb. 37: 133. 1905; 96.

Similar to *P. densivenium*; leaves about 4.5 dm. long; peduncle and spathe 4 cm. long; pistillate and staminate inflorescences subequal, 2 cm. long; pistil 4-celled. Neg. 12279.

Puno: Sandía to Chunchosmayo, 1,500 meters, *Weberbauer 1352*.

10. HOMALOMENA Schott

Reference: Pflanzenr. IV. 23Da. 1912.

Stout herbs with long petioles vaginate only below and large, often mottled leaves. Spathe usually green, persistent. Inflorescence usually entirely fertile.—*Alocasia indica* (Roxb.) Schott, var. *metallica* Schott, cultivated at Yurimaguas and Iquitos (*Williams*), has deeply cordate leaves not at all peltate, strongly ribbed beneath, and a convolute spathe, little constricted.

Homalomena peltata (Poepp.) Mast. Gard. Chron. 7: 273. *f. 46*. 1877; 79. *Anthurium peltatum* Poepp. Nov. Gen. & Sp. 3: 83. (excl. pl.). 1845.

A large herb with peltate cordate-ovate acuminate leaves, 5–6 dm. long and 3.5–4 dm. wide, glabrous above and reddish-pubescent beneath; petioles muricate below and pubescent, vaginate for a third their length; peduncles about 1.5 dm. long, densely puberulent; spathe yellow-spotted, the tubular-convolute lower part 5–7 cm. long, the upper part or blade 13 cm. long, with a cusp 2 cm. long; spadix sessile, the pistillate inflorescence 4 cm. long, 1.5 cm. thick, the slenderer staminate portion to 1.5 dm. long.—Other Andean species to be expected include *H. Roezlii* (Mast.) Regel and *H. Wallisii* Regel with glabrous leaves, those of the former ovate-oblong, 2–4 dm. wide, and of the latter ovate-obovate, 6–7 cm. broad; also *H. crinipes* Engler and *H. picturata* (Lind. & André) Regel, the former with sagittate-hastate leaves and the latter with cordate-ovate ones.

Huánuco: Cochero (*Poeppig*). Colombia.

11. XANTHOSOMA Schott

Reference: Engler, Pflanzenr. IV. 23E. 1920.

Herbs, usually huge, with petioles vaginate below and cordate, hastate, or dissected leaves. Spadix shorter than the persistent spathe, partly sterile. Ovary 2–4-celled, the ovules many.—The tubers of some species, boiled or roasted, are edible. Herrera has recorded for some unknown form the name "uncucha."

Leaves entire or merely cordately lobed at base.

Leaves glabrous.

Cordate-ovate, 3–4.5 dm. long..... *X. Poeppigii.*

Cordate-sagittate.

Leaves to 1 meter long; spathe white.... *X. brevispathaceum.*

Leaves to 4 dm. long; spathe purple..... *X. purpuratum.*

Leaves pubescent, especially beneath.

Distinctly cordate at base..... *X. pubescens.*

Rounded-obtuse at base..... *X. trichophyllum.*

Leaves hastately lobed at base or divided.

Merely lobed at base, the lobes divaricate..... *X. tarapotense.*

Pedately dissected..... *X. helleborifolium.*

Xanthosoma brevispathaceum Engler, Bot. Jahrb. 37: 137. 1905; 53.

A gigantic herb, its great opaque leaves to 1 meter long and 6 dm. broad, their basal lobes a third to a half as long as the upper one;

spathe tube ovoid, 4–6 cm. long, the white oblong-lanceolate blade 1.5–2 dm. long and 4 cm. wide; spadix about as long, sessile, the cylindrical pistillate portion 2 cm. long, the sterile little longer, the staminate 10 times longer.—*X. hylaeae* Engl. & Krause may be distinguished by its smaller leaves, their lateral nerves about 2.5–4 instead of 4–6 cm. remote. Neg. 12304.

Junín: La Merced, 1,000 meters, *Weberbauer 1821;* 282.—Huánuco: Muña, *4267* (det. Krause).

Xanthosoma helleborifolium (Jacq.) Schott, Oesterr. Bot. Zeitschr. 15: 33. 1865; 61. *Arum helleborifolium* Jacq. Icon Pl. Rar. 3: *pl. 613*. 1786–93.

The only Peruvian species with divided leaves. Typically the spathe is about 1 dm. long. The following Poeppig collection is var. *variegatum* (Desf.) Engler with purple-dotted and lined petioles and peduncles; the Weberbauer number, var. *Weberbaueri* Engler, robust, with a spathe 2 dm. long.

Loreto: Yurimaguas (*Poeppig*). Iquitos, cultivated, *Williams 3554* (det. Krause).—Piura: Hacienda San Antonio, 1,000 meters, *Weberbauer 6007*. To Central America and the West Indies. "Mano abierta."

Xanthosoma Poeppigii Schott, Oesterr. Bot. Wochenbl. 4: 417. 1854; 51. *X. Mafaffa* Schott, var. *Poeppigii* (Schott) Engler in Mart. Fl. Bras. 3, pt. 2: 193. 1878.

Petioles 4–6 dm. long, pale green with violet sheaths; blades 2–3.5 dm. broad, green above, pruinose beneath, subacuminate-cuspidate, the basal lobes retrorse, 1–1.5 dm. long; principal lateral nerves 5–6; peduncles 3–4 dm. long; spathe tube green without, deep purple within, 6–7 cm. long, the blade yellowish green with brown-purple nerves, to 3 dm. long and half as broad; spadix stipe 2 mm. long; pistillate inflorescence 3–3.5 cm. long, orange, the sterile 5 cm. long, violet, the staminate rose-color, twice as long.—The var. *Mafaffa* (Schott) Macbride has the basal lobes slightly introrse and the tube of the spathe yellowish green.

Loreto: *Ule 6301; Poeppig 1753*. Bolivia.

Xanthosoma pubescens Poepp. Nov. Gen. & Sp. 3: 89. *pl. 299*. 1845; 54.

Well marked by its ashy-puberulent petioles (2.5 dm. long) and its oblong-ovate, shortly pilose blades (especially beneath), about 2 dm. long and 1–1.5 dm. broad, their basal lobes suborbicular;

spathe pubescent, yellowish green, less than 1 dm. long, the tube only 2.5 cm. long. Neg. 12314.

Huánuco: Quebrada de Casapí (*Poeppig*).—Junín: La Merced, *Schunke 366* (det. Krause).

Xanthosoma purpuratum Krause, Notizbl. Bot. Gart. Berlin 11: 621. 1932.

Petioles 3–3.5 dm. long; blades subtriangular, deeply sagittate, nearly 3 dm. broad, the broadly ovate-triangular upper lobe obliquely acuminate, 2 dm. long or longer, at base to 2.5 dm. broad, the lower lobes shorter and broadly oblong; spathe deep purple, paler at base. —Allied to *X. hylaeae* Engler with broader leaf sinus and whitish spathe. 14a.

Loreto: Soledad on the Río Itaya (*Killip & Smith 29570*).

Xanthosoma tarapotense Engler, Bot. Jahrb. 37: 138. 1905; 58.

Leaves about 4 dm. long and 1 dm. broader, the widely spreading, oblong basal lobes 2.5 dm. long and 12 cm. wide; spathe tube 5 cm. long, the oblong blade 7.5 cm. long and 3.5 cm. broad; pistillate inflorescence 1.5 cm. long, the staminate 9 cm. long. Neg. 12317.

San Martín: Tarapoto, *Ule 6906*.

Xanthosoma trichophyllum Krause, Notizbl. Bot. Gart. Berlin 11: 622. 1932.

Similar to *X. pubescens*, but shorter petioles subvillous and leaves nearly emarginate at base; spathe white, 4–4.5 cm. long.—15a.

Loreto: Soledad on the Río Itaya (*Killip & Smith 29640*).

12. CALADIUM Vent.

Reference: Engler, Pflanzenr. IV. 23E. 1920.

Large, acaulescent herbs from rhizomes or tubers, the leaves often mottled and usually peltate-sagittate.—Very similar to *Xanthosoma* but style none. The rhizomes of some species are edible when cooked.

Leaves glabrous, distinctly peltate.

Basal lobes about one-fourth connate or the leaves large.

Leaves sagittate-ovate.....*C. bicolor.*

Leaves sagittate-lanceolate.....*C. picturatum.*

Basal lobes about one-half connate, the leaves 3 cm. wide. *C. Humboldtii.*

Leaves pubescent, little if at all peltate.....*C. pubescens.*

Caladium bicolor (Ait.) Vent. Descr. Cels. *pl. 30.* 1800; 31. *Arum bicolor* Ait. Hort. Kew. 3: 316. 1789.

Petioles smooth, 3–4 times longer than the sagittate-ovate or ovate-triangular blades; blades usually green above and the semi-ovate basal lobes connate to one-half their length, in var. *surinamense* (Miq.) Engler, or variously colored above and almost wholly connate (mostly cultivated states); peduncle little shorter than the leaves; spathe tube ovoid, often violet in the throat, little exceeding the white-cuspidate blade; staminate portion of the spadix twice longer than either the pistillate or sterile portions.—*C. marmoratum* Mathieu, with a subspheric spathe tube, strongly constricted above, from Guayaquil, may be found in Peru, as also *C. sororium* Schott, with ovate leaves, shallowly cordate at base, and an oblong-ellipsoid spathe tube.

Huánuco: Posuso (*Ruiz & Pavón*).—Junín: Maranioch Valley (*Philippi*).—Loreto: Mainas (*Poeppig*). Río Acre, *Ule 9209.* La Victoria, cultivated, *Williams 3181, 3183, 2602.* Pebas, in forest, *Williams 1929, 1833.* Yurimaguas, cultivated, *Williams 4648, 4512, 4511.* Iquitos, *Williams 3579.* Caballo-cocha, in forest, *Williams 2433, 2380, 2020.* Brazil. "Tashá," "oreja de perro," "patquina."

Caladium Humboldtii Schott, Oesterr. Bot. Wochenbl. 4: 417. 1854; 38.

Chiefly distinctive by its small size, the mottled leaves rarely 7 cm. long, oblong-ovate, with ovate-triangular basal lobes connate for half their length; petioles very slender, to 17 cm. long, usually much shorter. Neg. 12320.

Loreto: Along Río Itaya, *Williams 172* (det. Krause). Pebas, in forest, *Williams 1919.* Brazil. "Pavoncito," "brasileriña."

Caladium picturatum (Lind.) Koch & Bouché, Ind. Sem. Hort. Berol. App. 6. 1854; 36.

Very much like *C. bicolor,* but the leaves of a sagittate-lanceolate type, with lanceolate basal lobes often connate for less than a quarter their length; also variable as to coloring, the Peruvian material being referred to var. *porphyroneuron* (C. Koch) Engler, more or less violet and red, with hastate-sagittate leaves, their basal lobes one-sixth to one-third connate, and the var. *Trouletzkoyi* (Chantin) Engler, similar but the nerves above pale or rosy.—The valid publication of the name of this species is uncertain, but it was designated by Linden in his catalogues at least in 1852, and the above citation gives

it precedence, fortunately, over several variants published as species about the same time. Well marked and also to be expected is *C. macrotites* Schott, with hastate-sagittate leaves, the lobes all elongate-lanceolate.

Loreto: Mainas (*Poeppig 2286*); *Williams 3956* (det. Krause). Brazil.

Caladium pubescens N. E. Brown, Bot. Mag. 137: *pl. 8402.* 1911; 29.

Petioles to 3 dm. long, densely pubescent, as also the pale green peduncles and cordate-ovate blades, the latter 2–3 dm. long and 1–2.5 dm. broad, their semiorbicular basal lobes 1.5–3 cm. long.—Unique except for *C. puberulum* Engler, which has sagittate leaves with white-pilose nerves. The type locality is uncertain.

San Martín: Moyobamba (*Forget*).

14. ASTEROSTIGMA F. & M.

Reference: Engler, Pflanzenr. IV. 23F. 1920.

Herbs from depressed rounded tubers. Leaves 3-parted, the middle segment pinnatifid, the lateral irregularly so. Peduncles spotted. Spathe erect, free. Ovary 3–5-celled, the ovules solitary.

Asterostigma Pavonii Schott, Prodr. 339. 1860; 46.

Petioles 2.5 dm. long; blades about 2 dm. long and 1.5–1.75 dm. broad, the adult pinnately dissected, the 7–9 oblong-lanceolate segments long-acuminate; staminodia of the pistillate flowers free. —The other known species are geographically remote. Neg. 12290.

Huánuco: Posuso, *Ruiz.*—Huancavelica: Between Huancamayo and San Gregorio, 1,600 meters, *Weberbauer 6567.*—Puno: Sandía, *Weberbauer.* Bolivia.

15. TACCARUM Brongn.

Reference: Engler, Pflanzenr. IV. 23F. 1920.

A tuberous herb with dissected leaves. Spathe adnate to the soon greatly elongate spadix. Ovary 3-celled, the ovules solitary.

Taccarum Weddelianum Brongn. ex Schott, Gen. Aroid. *pl. 65.* 1858; 43.

The much larger, ovate-triangular, middle division of the leaf bi- or tri-pinnately parted, the ultimate divisions in the mature leaf 1 cm. broad; petiole 4–8 dm. long, the blade to 4 dm. long and

5 dm. broad, the lateral segments 2–3 dm. long; spadix finally greatly exceeding the ovate-ventricose spathe.—Illustrated, Pflanzenr. IV. 23F: 44. Other known species are remote geographically.

Loreto: Río Acre, *Ule 9208*. Brazil; Paraguay.

13. SYNGONIUM Schott

Reference: Engler, Pflanzenr. IV. 23E. 1920.

Scandent shrubs with divided leaves. Peduncles reflexed in fruit, shorter than the spathes. Ovary 1–2-celled, the ovules solitary. —Williams has recently found an additional species, as yet undescribed, that is distinctive in lacking the characteristic lateral ear-like leaf lobes.

Syngonium Vellozianum Schott, Oesterr. Bot. Wochenbl. 4: 418. 1854; 125.

A scandent plant with 3-parted leaves, the lateral divisions each with an ear-like oblong-elliptic lobe at the base; petioles little longer than the leaves; peduncles long and slender.—This form is var. *oblongisectum* Engler, illustrated, Pflanzenr. IV. 23E: 126.

Junín: Chanchamayo Valley, 1,000 meters, *Weberbauer 1822*.— Loreto: Yurimaguas, *Williams 4986*. Leticia, *Williams 3054*. La Victoria, *Williams 2631* (all det. Krause). Brazil.

Syngonium yurimaguense Engler, Bot. Jahrb. 37: 141. 1905; 128.

Petioles about 3 dm. long, 2–3 times longer than the 3 oblong leaf segments, the lateral ones with a triangular auricle 2–3 cm. long at base; peduncle scarcely 1 dm. long.—*S. amazonicum* Engler has 5-parted leaves. Neg. 12302.

Loreto: Yurimaguas, *Ule*. Río Acre, *Ule 9237* (det. Engler).

16. ULEARUM Engler

Reference: Engler, Pflanzenr. IV. 23F. 1920.

A rather small herb from a horizontal rhizome. Spathe adnate below. Inflorescence strongly interrupted, with a few scattered sterile flowers, and with a club-shaped appendix.—Appropriately named for Ernest Ule, in recognition of his wide botanical exploration.

Ulearum sagittatum Engler, Bot. Jahrb. 37: 95. 1905; 66.

Petioles 1.5–2.5 dm. long, the sagittate blades 9–13 cm. long, 7–9 cm. broad, the spreading obtuse triangular lobes to 7 cm. long

and 3.5–4 cm. wide; peduncles 2–2.5 dm. long; spathe 4 cm. long.—Illustrated, Pflanzenr. IV. 23F: 65.

Loreto: Pongo de Cainarache, *Ule 6323*.

17. PISTIA L. Water Lettuce

This curious and widely distributed little plant, floating on the borders of sunny slow-flowing waters, is too well known to need description here. It is illustrated in Pflanzenr. IV. 23F: 251. It naturally suggests a close relationship between the aroids and the duckweeds, and thereby has given students of classification much to write about.

Pistia Stratiotes L. Sp. Pl. 963. 1753.

The leaves vary from obverse-triangular to obovate-spathulate, var. *obcordata* (Michx.) Engler; or to linear-oblong, var. *linguiformis* Engler.

Lima: Callao and Lurín, *Ruiz; Gaudichaud; Lesson* (*Dombey 189*).—Loreto: Caballo-cocha, *Williams 2425*. Río Ampiyaco, *Williams 1988*. Iquitos, *Killip & Smith 29278*. Generally distributed in tropical America.

19. LEMNACEAE. Duckweed Family

Reference: Hegelmaier, Bot. Jahrb. 21: 268–305. 1895.

The smallest flowering plants are duckweeds, distributed around the world and well known because of the green scum they form as thousands of individual plants float together on the surface of quiet semi-stagnant waters.

1. LEMNA L.

Each little disk-like plant has a solitary rootlet and no vascular tissue.—*Spirodela polyrrhiza* (L.) Schleid., with several rootlets, is widely distributed in South America. Three species of *Wolffia* (rootlets none) are also to be expected: *W. colombiana* Karst., *W. brasiliensis* Wedd. and *W. oblonga* (Phil.) Hegelm. The last, known also as *Wolffiella oblonga* (Phil.) Hegelm., is oblong-elliptic, the other species roundish. The first is bright green, the second densely brown-punctate.

Lemna gibba L. Sp. Pl. 970. 1753.

Plants somewhat irregular in outline, 2–4 mm. long, usually 3–5-nerved; spathe sac-like.

Cuzco: Valley of Oropeza, Huambutío, *Herrera 2081*.—Huánuco: Llata, 2,100 meters, *2269*. Widely distributed in both hemispheres.

Lemna minima Philippi, Linnaea 33: 239. 1864.

Plants oblong-elliptic, thick, papulose, 1–4 mm. long, 1-nerved or nerveless; spathe open; root cap straight or nearly so.—*L. cyclostasa* (Ell.) Chev. is thin, epapulose, and has a curved root cap. Both species are widely distributed in the New World. All three illustrated, Britton and Brown, Ill. Fl. ed. 2. 1: 447, 448. 1913.

20. MAYACACEAE

Moss-like plants bearing near the summit of the densely leafy, simple stems a small solitary long-peduncled flower. Sepals, petals, and stamens 3, the latter free.—A single genus.

1. MAYACA Aubl.

Besides the following, *M. longipes* Mart. and *M. fluviatilis* Aubl., both known from Amazonian Brazil, are to be expected. The former is about 3 dm. high, and the latter may be known by the lateral chinks of the anthers. *M. longipes* is illustrated, Mart. Fl. Bras. 3, pt. 1: *pl. 31*.

Mayaca Endlicheri Poepp. ex Seubert in Mart. Fl. Bras. 3, pt. 1: 230. 1855.

Stems a few cm. high; anthers with a short tube at the upper end; flowers lilac.

San Martín: Moyobamba, *Weberbauer 4670*.—Without locality (*Poeppig*). Brazil.

21. XYRIDACEAE. Yellow-eyed Grass Family

Reference: Malme, Arkiv Bot. 13, pt. 3: 1–103. 1913.

Besides the following genus, *Abolboda* H. & B. may be found in the Amazon region. It has blue flowers. Most likely to occur is *A. Poeppigii* Kunth, a little tufted plant with few-flowered heads and narrow, sharply acuminate bracts.—Illustrated, Mart. Fl. Bras. 3, pt. 1: *pl. 30*. 1855.

1. XYRIS L.

Small or tall and slender herbs with narrow, rather rigid and often compressed leaves sheathing the base of a scape that bears a head of densely imbricated, yellow or white flowers, each flower subtended by a hard scale-like bract. Sepals 3, 2 small, boat-shaped and

persistent, the third thin or wanting. Petals 3, with a fertile stamen on each claw, often alternating with a bearded staminodium.

Leaves only a few mm. wide, often shorter than 1 dm.

Leaves usually transversely rugulose; spikes often many-flowered; some of the bracts with prominent flat backs.

Bracts entire or not lacerate-margined..... *X. savanensis.*

Bracts conspicuously lacerate-margined..... *X. lacerata.*

Leaves not rugulose; spikes few-flowered, the dark bracts often carinate below the apex..... *X. subulata.*

Leaves about 1 cm. wide, often 2–3 dm. long..... *X. macrocephala.*

Xyris lacerata Pohl ex Seubert in Mart. Fl. Bras. 3, pt. 1: 216. 1855.

Often 3–4 dm. high, the slender stems and leaves (about 1–2 dm. long, 2 mm. wide) densely but minutely verruculose-rugulose; old leaf bases very dark, up to 1 cm. wide; heads nearly globose, the pale green and brown-margined roundish bracts (or finally brown) faintly carinate but flat-backed.—Illustrated, Pflanzenfam. 15a: 37. *fig. 12.*

Junín: Eneñas, 1,700 meters, open sphagnum bog, *Killip & Smith 25693.* Brazil.

Xyris macrocephala Vahl, Enum. 2: 204. 1806.

Readily recognizable from our other species by its much greater size, the spikes about 1 cm. thick, but simulating exactly *X. Jupicai* L. C. Rich., most likely occurring, and distinguishable from it only by its dense brown beard, the staminodium of the latter with but few and hyaline hairs.

Loreto: Pebas, *Williams 1708* (det. Malme). South America.

Xyris savanensis Miquel, Linnaea 18: 605. 1844.

Typically a pale green annual with leaves (a little tuberculate-scabrous) 5–8 cm. long and 2–3 mm. broad; spikes 5–8 mm. long, 3.5–4.5 mm. thick; bracts 3–5 mm. long, entire, not at all keeled.—*X. andina* Malme, collected by Pearce in Ecuador, perhaps in Peru, has erugulose leaves 1–1.5 mm. broad. Other species with several-flowered spikes to be expected in the Amazon region are *X. filiscapa* Malme, *X. Uleana* Malme, and *X. eriophylla* Reichenb. The last resembles *X. savanensis,* but its leaves are often narrower and its spikes subglobose, with bracts 6–7 mm. long; the other two species have erugulose leaves, the first with leaves 1 mm. wide and with

cartilaginous margins; the diagnostic feature of the second is its broader leaves and narrow intermediate bracts, up to 2.5 mm. broad.

San Martín: Moyobamba, edge of savanna, *Weberbauer 4571* (det. Malme); 292. Colombia and Guiana to Paraguay.

Xyris subulata R. & P. Fl. 1: 46. *pl. 71*. 1798.

Leaves 4–5 cm. long, setaceous, somewhat tuberculate-scabrous; scapes about twice as long; spikes 5–8 mm. long, less than 4 mm. thick.

Huánuco: Pillao, *Ruiz*. Vilcabamba, *5183*.—Cuzco: Paso de Tres Cruces, *Pennell 13886*. Sachapata (*Lechler 2548*).—Puno: Sangabán, *Lechler*. Ecuador.

Xyris subulata HBK. var. **macrotona** Nilss. Svensk. Vet. Akad. Handl. 24, No. 14: 45. *pl. 2*. 1892.

Leaves glabrous, 8–15 cm. long; scapes to 3.5 dm. high, the spikes as much as 4 mm. thick.

Junín: Huacapistana, 3,500 meters, *Weberbauer 2088;* 252.—Amazonas: Molinopampa, 2,000 meters, *Weberbauer 4349;* 264.—Cajamarca: Jaén, *Weberbauer 6142*. Ecuador.

22. ERIOCAULACEAE. Pipewort Family

Reference: Ruhland, Pflanzenr. IV. 30. 1903.

Rather rigid, stemless or tufted terrestrials, or the pedicels not solitary.

Stamens 4 or 6; petals glandular.....1. *Eriocaulon.*

Stamens 2 or 3; petals not glandular.....2. *Paepalanthus.*

Laxly growing leafy-stemmed aquatic or subaquatic...3. *Tonina.*

1. ERIOCAULON L.

Apparently stemless (Peruvian species), more or less linear-leaved, little plants, the minute flowers borne in dense, often whitish heads at the summit of slender, sometimes elongate peduncles. Flowers trimerous or dimerous. Stamens 4 or 6. Petals glandular within at apex, rarely lacking in the pistillate flowers.

Eriocaulon microcephalum HBK. Nov. Gen. & Sp. 1: 253. 1816; 53. *E. brachypus* Heurck & Muell. Arg. in Heurck, Obs. Bot. 1: 96. 1870.

A tiny plant, the subulately narrowed leaves to 1.5 mm. broad at the middle and 1–2 cm. long; peduncles sometimes a little longer; heads laxly flowered, sparsely white-villous; sepals of the pistillate flowers

slightly winged dorsaly.—The similar *E. Spruceanum* Koern. (in Mart. Fl. Bras. 3, pt. 1: 488. 1863), with leaves and peduncles 1–3 dm. long, is to be expected in eastern Peru.

Junín: Huacapistana, 3,400 meters, *Weberbauer 2269* (det. Ruhland); 251.—Cuzco: In mats, Paso de Tres Cruces, 3,800 meters, *Pennell 13864*.—Cajamarca: Nanchó, *Raimondi*. Ecuador; Mexico.

Eriocaulon peruvianum Ruhl. Pflanzenr. IV. 30: 58. 1903.

Similar to *E. microcephalum*, but the leaves 4–4.5 cm. long, the fasciculate peduncles 1 dm. long or longer, and the sepals rounded on the back. Neg. 10564.

San Martín: Chachapoyas (*Mathews*).

2. PAEPALANTHUS Mart.

Small, often tufted or stemless herbs, not infrequently simulating *Eriocaulon* in aspect, but the stamens of the same number as the petals, 2 or 3, and the latter eglandular. The petals of the pistillate flowers may be free, or somewhat connate at the middle (*Syngonanthus*).—A plant at least vegetatively nearly similar to *P. muscosus* Koern. of Colombia was collected by Raimondi at Cutervo, Cajamarca. It is distinguishable from *P. pilosus* by its larger (4–5 mm. thick) heads, with acutish bracts.

Plants with evident stems.

Peduncles many at apex of stems.

Peduncles subapressed-pubescent; leaves oblongish. *P. caulescens.*

Peduncles glabrous or pilose, or puberulent above; leaves linear-subacute, at least above.

Involucre green, stellately spreading, the bracts acuminate. *P. bifidus.*

Involucre brownish, pilose, the bracts obtuse or, if acuminate, obscure.

Leaves glabrous or nearly so.

Peduncles glabrous or nearly so, often short. . . *P. pilosus.*

Peduncles pilose, capillary. . . . . *P. polytrichoides.*

Leaves conspicuously villous-ciliate. . . . . *P. Weberbaueri.*

Peduncles solitary in the leaf axils or one terminal.

Leaves to 1 mm. wide, rigid, pungent, merely ciliate. *P. Stuebelianus.*

Leaves to 3 mm. wide, scarcely pungent, hirsute-villous, at least on edges.....*P. Weberbaueri.*

Leaves to 1.5 mm. wide, soft or mucronate, glabrous or the long hairs sparse and straggling.....*P. pilosus.*

Plants apparently stemless.

Leaves linear-lanceolate or lanceolate, mostly more than 3 mm. wide.

Leaves puberulent or villous, 1–3 cm. wide at the middle. *P. planifolius.*

Leaves hirsute (sometimes sparsely), 2–8 mm. wide at the middle.

Leaves subulately acute.....*P. ensifolius.*

Leaves obtuse or obtusish.....*P. flavescens.*

Leaves linear, less than 2 mm. wide.

Bracts acutish, straw-colored.....*P. peruvianus.*

Bracts very obtuse, orange-yellow or brown.

Bracts yellow, as long as the flowers.....*P. nitens.*

Bracts brown, shorter than the flowers.....*P. pilosus.*

Paepalanthus bifidus (Schrad.) Kunth, Enum. 3: 512. 1841; 153. *Eriocaulon bifidum* Schrad. in R. & S. Mant. 2: 468. 1824.

Stems several to many cm. long, usually simple; leaves linear-subulate, pilose, 1 to several cm. long; peduncles spreading-pilose; heads sordidly white-villous at apex, 3–4 mm. broad; bracts linear-lanceolate.

San Martín: Moyobamba, 1,000 meters, *Weberbauer 4607* (det. Ruhland). Brazil to Colombia and the Guianas.

Paepalanthus caulescens (Poir.) Kunth, Enum. 3: 537. 1841; 267. *Eriocaulon caulescens* Poir. Encycl. Suppl. 3: 162. 1813. *Syngonanthus caulescens* Ruhl. Pflanzenr. IV. 30: 267. *fig. 38.* 1903.

Green and glabrate or more or less pilose, 1 cm. to 8 dm. high; leaves mostly 2.5 mm. broad at the middle; heads pale or straw-colored, like the glabrous or ciliolate, narrowly oblong-ovate, acute bracts; petals of pistillate flowers united at middle.

San Martín: Moyobamba, *Weberbauer 4565* (det. Ruhland); 292.—Loreto: Balsapuerto, *Killip & Smith.* South America generally.

Paepalanthus ensifolius (HBK.) Kunth, Enum. 3: 501. 1841; 208. *Eriocaulon ensifolium* HBK. Nov. Gen. & Sp. 1: 254. *pl. 70.* 1816.

Leaves linear-lanceolate, subulate, shortly hirsute and, especially toward the base, ciliate, 5–6 mm. broad, 8–9 cm. long; peduncles near apex spreading-puberulent; bracts very broadly ovate, light brownish.

San Martín: Chachapoyas (*Mathews*). Bagua to Chachapoyas, *Raimondi*. Colombia.

Paepalanthus flavescens (Bong.) Koern. in Mart. Fl. Bras. 3, pt. 1: 423. 1863; 231. *Eriocaulon flavescens* Bong. Mém. Acad. St. Pétersb. VI. 1: 628. 1831. *Leiothrix flavescens* Ruhl. Pflanzenr. IV. 30: 231. 1903.

Leaves spreading-hirsute, lanceolate, 5–13 cm. long, 2–8 mm. broad; peduncles shortly pubescent or glabrous; heads 1 cm. thick; bracts oblong-obovate, acute, somewhat yellowish.

Puno: Cachicachi, toward Sandía, 1,100 meters, *Weberbauer 1292* (det. Ruhland); 242. South America.

Paepalanthus nitens (Bong.) Kunth, Enum. 3: 531. 1841; 254. *Eriocaulon nitens* Bong. Mém. Acad. St. Pétersb. VI. 1: 633. 1831. *Syngonanthus nitens* Ruhl. Pflanzenr. IV. 30: 254. 1903.

Leaves rigid, 1.5–2.5 cm. long, glabrous or lightly puberulent; peduncles glabrous, to 4.5 dm. high; heads 5–8.5 mm. thick; petals joined at middle; bracts obovate-oblong, very obtuse, glabrous, orange or yellow, as the heads, or paler.—*P. gracilis* Koern., similar, has been found at Manaos. The bracts slightly exceed the small (3–5 mm. thick) heads.

Amazonas: Molinopampa, in sphagnum moor, 2,000 meters, *Weberbauer 4328* (det. Ruhland); 264. Brazil.

Paepalanthus peruvianus (Ruhl.) Macbr. Field Mus. Bot. 11: 8. 1931; 253. *Syngonanthus peruvianus* Ruhl. Pflanzenr. IV. 30: 253. 1903.

Similar to *P. nitens;* leaves pilose above; peduncles shortly pubescent; heads yellow; bracts curved, rigid, yellowish.—A Raimondi specimen from Cutervo, Cajamarca, would key here. Its leaves are 2.5–3 cm. long, and the peduncles are slightly viscidulous below the heads. Neg. 10695.

San Martín: Cuesta de Lejía near Moyobamba, *Stuebel 196*, type.

Paepalanthus pilosus (HBK.) Kunth, Enum. 3: 518. 1841; 156. *Eriocaulon pilosum* HBK. Nov. Gen. & Sp. 1: 251. 1816. *E. dendroides* HBK. op. cit. *pl. 69, f. 2.*

Plants only a few cm. high, often growing in mats or forming cushions; leaves 1–2 cm. long, linear-lanceolate, more or less pilose; peduncles puberulent or glabrous above, 3–9 cm. long; heads yellowish, villous, 2–3 mm. thick.—Variable in size and habit. *P. umbellatus* (Lam.) Kunth, a bog plant about 10 cm. high with gray heads on many lax peduncles, has been found as near as Manaos.

Puno: Sangabán (*Lechler*).—Cuzco: Paso de Tres Cruces, 3,800 meters, *Pennell 13866*.—Amazonas: Chachapoyas, 3,000 meters, *Weberbauer 4416* (det. Ruhland); 264.—Huánuco: Monzón, *Weberbauer* (det. Ruhland). Chinchao region, *Weberbauer 6826*. Vilcabamba, 1,800 meters, sphagnum banks, *5182*. Colombia.

Paepalanthus planifolius (Bong.) Koern. in Mart. Fl. Bras. 3, pt. 1: 413. *pl. 52*. 1863; 208. *Eriocaulon planifolium* Bong. Mém. Acad. St. Pétersb. VI. 1: 729. 1831.

Leaves 1.5–5 dm. long; bracts fuscous, ciliate.—The only Peruvian species with broadly lanceolate leaves.

Huánuco: Pillao (*Pavón*). Monzón, 2,500 meters, *Weberbauer 3535;* 255.—Cajamarca: Cutervo, *Raimondi* (det. Ruhland).—Amazonas: Molinopampa, 2,000 meters, *Weberbauer 4531* (det. Ruhland); 264. Brazil.

Paepalanthus polytrichoides Kunth, Enum. 3: 504. 1841; 157.

Slender, 3–4 cm. high; leaves linear from an ovate-dilated base, 6–7.5 mm. long; heads hemispheric, densely white-villous at the tip; exterior bracts glabrate, all spatulate. Neg. 10637.

Peru: (*Henschel*).—Amazonian Brazil.

Paepalanthus Stuebelianus Ruhl. Pflanzenr. IV. 30: 174. 1903.

A rigid, densely leafy plant, 1–2 dm. high; leaves linear, 7–9 mm. long; peduncles puberulent, 7–9 cm. long; heads globose, 4–5 mm. thick; bracts broadly ovate or rhombic, shortly acuminate, ciliate and puberulent. Neg. 10651.

San Martín: Cuesta de Lejía, Moyobamba (*Stuebel 19a*, type). Laurel, *Raimondi* (det. Ruhland). Molinopampa, 2,000 meters, *Weberbauer 4350* (det. Ruhland); 264. Chachapoyas, *Williams 7571*.

Paepalanthus Weberbaueri Ruhl. Bot. Jahrb. 37: 519. 1906.

Stems 4–20 cm. long; leaves lance-linear, acuminate, mostly arcuate, 1.5–4 cm. long; peduncles 1–3 dm. high; heads villous,

5–7 mm. thick; bracts narrowly elliptic or subovate, acute or acutish, greenish brown, subappressed-villous, thin. Neg. 10662.

Puno: Near Cachicachi, 2,000 meters, *Weberbauer 1152.* Pamaspata, *Weberbauer 1326;* 242.

3. TONINA Aubl.

A laxly growing, leafy-stemmed, aquatic or subaquatic herb. Flowers trimerous; staminate shortly tubular; pistillate with free and conspicuously pilose-ciliate segments. Peduncles seemingly extra-axillary.—Illustrated, Pflanzenr IV. 30: 239. A rather artificial genus, but conveniently accepted.

Tonina fluviatilis Aubl. Pl. Guian. 2: 857. *pl. 330.* 1775.

Stems 2 to several dm. long; leaves at base and bracts at base and apex ciliate, otherwise glabrous; peduncles mostly less than 1 cm. long, solitary, axillary; flowers greenish.

Loreto: Iquitos, *Williams 7995, 3779; Killip & Smith 26908.* Mishuyacu, 100 meters, *Klug 305.*—San Martín: Moyobamba, 1,200 meters, *Weberbauer 4652.* Extending to Brazil and Central America.

23. THURNIACEAE

Thurnia sphaerocephala (Rudge) Hook. f. Icon. 15: 6. *pl. 1407.* 1883, could occur in Amazonian Peru, since it grows in adjacent Brazil. It is sedge-like in appearance, with a tight globose head of small flowers with exserted stamens and style. The original illustration is repeated in Pflanzenfam. ed. 2. 15a: 58. 1930. According to Ducke, it grows in small streams where the current is swiftest.

24. RAPATEACEAE

These shore plants often resemble certain sedges, such as the typical group of *Dichromena.*

1. RAPATEA Aubl.

Scapose herbs with ensiform leaves and a terminal capitate inflorescence of few to many spikes closely subtended by a spathe of 2 leaf-like bracts. Flowers densely imbricate in many series of scale-like bracts. Spikelets long-pediceled.—Other genera are to be expected, as the family is chiefly Amazonian. *Spathanthus unilateralis* (Rudge) Desv. has been found at Manaos. It has only one bract and a 1-seeded fruit.

Rapatea spectabilis Pilger, Verh. Bot. Ver. Brandenb. 47: 101. 1905.

Leaves 4–5 dm. long and 6–7 cm. wide; spathe bracts long-attenuate, to 1.5 dm. long; brown bracts of the numerous spikelets subrotund, 3–5 mm. long; sepals 11–14 mm. long; petals rotund, yellow.—Other species are smaller plants. Neg. 7556.

Loreto: Iquitos, *Ule 6251; Williams 3789; Killip & Smith 27321.* La Victoria, *Williams 2916.*

25. BROMELIACEAE J. St. Hil.

By Lyman B. Smith[1]

References: Mez in DC. Monogr. 9. 1896; Mez, Pflanzenr. IV. 32. 1934–35.

Herbs or rarely shrubby perennials, mostly epiphytic or saxicolous. Leaves spirally arranged, usually basal, dilated-sheathing below, simple, entire or spinose-serrate, at least in youth bearing peltate scales which serve to collect and hold moisture. Inflorescence simple or compound, of spikes or racemes, usually bearing brightly colored, conspicuous bracts. Flowers perfect in all the Peruvian species. Perianth heterochlamydeous, the segments free or variously joined. Stamens 6, the filaments free or joined to the petals or to each other. Style 3-parted. Ovary superior to inferior, 3-celled. Fruit capsular or baccate. Seeds naked, winged, or plumose. Embryo small, situated at the base of the copious, mealy endosperm.—About 50 genera and 1,500 species, strictly confined to tropical and subtropical America.

Ovary partly or wholly superior; fruit capsular.

Seeds winged or caudate-appendaged; leaves usually spinose-serrate.

Ovary wholly superior.

Petals naked; herbs.

Seeds with a lateral wing; large, coarse plants with large flowers.....1. *Puya.*

Seeds caudate-appendaged at both ends; rather delicate plants with flowers 4–9 mm. long.....2. *Lindmania.*

Petals each with a single large scale at base; woody perennials. 3. *Deuterocohnia.*

Ovary in large part inferior, or if almost superior the seeds caudate-appendaged.....4. *Pitcairnia.*

[1] By courtesy of the Gray Herbarium of Harvard University.

Seeds plumose; leaves entire.

Coma basal, straight; style usually long and slender.

Petals free; inflorescence of one or more distichous-flowered spikes or rarely of a single polystichous-flowered spike.

Petals naked or rarely with vertical folds....5. *Tillandsia.*

Petals each bearing 2 scales.....6. *Vriesia.*

Petals more or less joined or conglutinated below; spikes polystichous-flowered.....7. *Guzmania.*

Coma apical, folded over; style short or none; spikes polystichous-flowered; sepals asymmetrical.....8. *Catopsis.*

Ovary wholly inferior; fruit baccate; leaves usually spinose-serrate.

Petals with their margins free but centrally fused to the filament tube, large, fleshy.....9. *Bromelia.*

Petals with their margins free or joined, but not fused centrally to a filament tube.

Inflorescence sunk in the center of the leaf rosette, or lateral.

Sepals symmetrical; pollen smooth.....10. *Greigia.*

Sepals asymmetrical; pollen with pores.....11. *Neoregelia.*

Inflorescence at the end of a definite scape, central.

Fruits and bracts always remaining distinct.

Petals naked.....12. *Streptocalyx.*

Petals each bearing 2 scales.

Stamens exserted at anthesis by the recurving of the petals; flowers 8–13 cm. long; pollen with longitudinal folds.....13. *Billbergia.*

Stamens included at anthesis; flowers not more than 4 cm. long in the Peruvian species; pollen with pores. 14. *Aechmea.*

Fruits and bracts coalescing at maturity to form a compound fruit; inflorescence simple, crowned with a coma of sterile foliaceous bracts.....15. *Ananas.*

1. PUYA Molina

Perennial, usually long-caulescent, simple or branching, coarse, often several meters high. Leaves densely rosulate, spinose-serrate in all the Peruvian species except *P. mitis.* Inflorescence various. Flowers showy. Sepals free, much shorter than the petals. Petals free, usually spreading at anthesis, naked in the Peruvian species.

Stamens nearly or quite included; filaments free. Ovary wholly superior, glabrous. Style slender, elongate. Capsule septicidal or loculicidal or both together forming six divisions. Seeds many, each with a single dorso-apical wing.—From 80 to 90 species. Chiefly in the Andes, with outlying species in the mountains of Costa Rica, Guiana, and northern Argentina. Type species, *P. chilensis* Mol.

Inflorescence or its branches fertile throughout or with only a slight tuft of much reduced sterile bracts at apex; flowering plant not over 4 meters high.

Inflorescence compound.

Branches of the inflorescence elongate, much exceeding the primary bracts.

Branches of the inflorescence laxly or subdensely flowered, definitely not strobilate.

Sepals acuminate.

Floral bracts pectinate.

Panicle lax, its branches spreading; sepals not more 18 mm. long.....1. *P. Roezlii.*

Panicle contracted, cylindric; sepals 35 mm. long. 2. *P. grandidens.*

Floral bracts entire or at most minutely serrulate.

Inflorescence dense; lateral branches not more than twice as long as the primary bracts. 3. *P. densiflora.*

Inflorescence laxly paniculate; lateral branches several times longer than the primary bracts. 4. *P. longisepala.*

Sepals rounded or abruptly acute and apiculate.

Plants large; leaves 6 dm. long.....5. *P. glaucovirens.*

Plants small; leaves not over 15 cm. long..6. *P. tuberosa.*

Branches of the inflorescence densely strobilate.

Floral bracts pectinate.....2. *P. grandidens.*

Floral bracts entire.

Floral bracts nearly equaling the sepals or exceeding them at anthesis, soon glabrous.

Spikes slender; sepals 30–33 mm. long.

Sepals acuminate.....7. *P. oxyantha.*

Sepals obtuse.....8. *P. ferox.*

Spikes broadly ellipsoid; sepals 18 mm. long. 9. *P. Weberbaueri.*

Floral bracts reaching about the middle of the sepals at anthesis, persistently lanate.

Spikes sessile or subsessile.....10. *P. llatensis.*

Spikes definitely stipitate.....11. *P. stipitata.*

Branches of the inflorescence abbreviated, shorter than the primary bracts.

Sepals subglabrous; primary bracts pectinate, laccate. 12. *P. laccata.*

Sepals densely appressed-lepidote to villous.

Sepals acuminate.

Floral bracts about equaling the sepals; indument ferruginous.....13. *P. cylindrica.*

Floral bracts distinctly shorter than the sepals; indument whitish.

Axis of the raceme longer than the flowers; floral bracts denticulate.....3. *P. densiflora.*

Axis of the raceme shorter than the lower flowers; floral bracts entire.....14. *P. longistyla.*

Sepals obtuse or broadly acute.

Sepals villous.

Primary bracts serrulate.....15. *P. fastuosa.*

Primary bracts entire.....16. *P. Herrerae.*

Sepals appressed-lepidote.....17. *P. depauperata.*

Inflorescence simple, racemose or subspicate.

Bracts coarsely and evenly serrate.....18. *P. pyramidata.*

Bracts entire or with a few weak serrulations.

Leaves entire.....19. *P. mitis.*

Leaves spinose-serrate.

Sepals densely tomentose or villous.

Flowers subsessile and floral bracts much shorter than the sepals.....20. *P. lanuginosa.*

Flowers distinctly pedicellate or else the floral bracts equaling the sepals.

Flowers distinctly pedicellate.

Floral bracts mostly shorter than the pedicels. 21. *P. Macbridei.*

Floral bracts much exceeding the pedicels.
Sepals obtuse or apiculate....22. *P. reflexiflora.*
Sepals acute .....23. *P. dolichostrobila.*
Flowers subsessile.
Floral bracts furfuraceous or glabrous.
Upper floral bracts subobtuse, apiculate, furfuraceous.....24. *P. isabellina.*
Upper floral bracts acuminate, glabrous.
25. *P. macrura.*
Floral bracts lanate.....26. *P. lanata.*
Sepals glabrous or at most stellate- or appressed-lepidote.
Sepals acuminate; floral bracts serrulate..27. *P. gracilis.*
Sepals broadly acute or obtuse.
Floral bracts densely appressed-lepidote, dull, purplish.
17. *P. depauperata.*
Floral bracts soon glabrous, lustrous, brown.
28. *P. strobilantha.*
Inflorescence with the apical half of each branch sterile; sterile bracts only slightly smaller than the fertile; flowering plant 9.5 meters high.....29. *P. Raimondii.*

1. **Puya Roezli** E. Morr. Belg. Hort. 35: 80. 1885. *Pitcairnia megastachya* Baker, Brom. 120. 1889. *Puya pectinata* L. B. Smith, Contr. Gray Herb. 98: 12. *pl. 4, f. 1–2.* 1932.

One meter or more high; stem short and stout. Leaves narrowly triangular, 1 meter long, 3 cm. wide above the sheath, densely white-tomentulose below, spinose-serrate, the spines mostly straight, 10 mm. long. Scape stout, its bracts dense, foliaceous. Inflorescence laxly bipinnate, up to 5 dm. long, white-tomentulose; primary bracts broadly ovate with a narrow lamina, coarsely spinose-serrate, shorter than the racemes. Racemes spreading, 15 cm. long, densely 15–25-flowered. Floral bracts broadly ovate, pungent, pectinate, much shorter than the sepals at anthesis. Flowers 3 cm. long, short-pedicellate; sepals subtriangular, acuminate, 18 mm. long, pale red; petals blue or dark purple; stamens and pistil included.

Rocky slopes. Lima: Common especially on southeastern exposures, in rock crevices, Matucana, 2,700 meters, *2920.*—Indefinite: Central Peru, western slopes of Andes, *Weberbauer 1695; Roezl.* Endemic.

Puya pectinata was based on stunted and immature material.

2. **Puya grandidens** Mez, Repert. Nov. Sp. 3: 10. 1906.

Scarcely 1 meter high; stem branching (*Weberbauer*!). Leaves 5 dm. long, narrowly triangular, 45 mm. broad, densely white-lepidote below, glabrous and lustrous above, pungent, the spines 7 mm. long. Scape slender, white-tomentose, becoming glabrous. Inflorescence densely bipinnate, contracted, cylindric, over 25 cm. long, its branches exceeding the primary bracts. Floral bracts ovate-elliptic, acute, pectinate, cobwebby-tomentose, exceeding the sepals. Flowers 4 cm. long, erect, short-pediceled; sepals triangular, acuminate, 35 mm. long, mucronate, cobwebby-tomentose; petals narrowly ligulate, tubular-erect, glaucous-green.

Ancash: Cajatambo, below Ocros, 3,000–3,200 meters, *Weberbauer 2738*. Endemic.

3. **Puya densiflora** Harms, Notizbl. Bot. Gart. Berlin 10: 791. 1929.

One meter or more high. Leaves not known. Scape 4 dm. long, its bracts dense, scarious, broadly ovate-lanceolate, long-caudate, spinose-serrate. Inflorescence elongate, densely subcylindric; racemes many, 10-flowered, 4–10 cm. long. Primary bracts like the scape bracts. Floral bracts oblong-lanceolate, aristate, sparingly villous to glabrous, 2–3 times as long as the pedicel. Sepals 3 cm. long, lance-acuminate, pungent; petals 4–5 cm. long, the blade narrowly oblong.

Cuzco: Valle del Apurímac, Province of Anta, Pueblo de Huancacalle, 2,500 meters, *Herrera 1954*. Valle de San Miguel, Media Naranja, 2,000 meters, *Herrera 2019*. Ollantaitambo, 3,000 meters, *Cook & Gilbert 569*. Endemic. "Achupalla."

4. **Puya longisepala** Mez, Bull. Herb. Boiss. II. 4: 629. 1904.

Conspicuous, 2 meters high. Leaves 75 cm. long, the blade narrowly triangular, 3 cm. broad, dark brown and lustrous above, densely white-lepidote below, the spines 8 mm. long. Inflorescence many-flowered, 5 dm. or more long, laxly bipinnate; axes stout, angled, soon glabrous; branches elongate, fertile throughout, suberect, 25 cm. long, 20–30-flowered. Primary bracts ovate-elliptic, pungent, serrate, equaling the lowest flowers. Floral bracts elliptic, acute, serrulate, shorter than the sepals. Pedicels stout, 1 cm. long; flowers suberect, 50–55 mm. long; sepals 3 cm. long, acuminate, appressed-pale-lepidote; petals linear, acute.

Rocky places. Puno: Near Sandía, 2,100 meters, *Weberbauer 550*. Endemic.

5. **Puya glaucovirens** Mez, Repert. Nov. Sp. 3: 9. 1906.

Conspicuous, 2 meters high. Leaves up to 6 dm. long, 2 cm. wide above the broadly ovate sheath, narrowly triangular, pungent, glabrous and lustrous above, sparingly lepidote below. Scape stout, erect, glabrous, its bracts foliaceous. Inflorescence bipinnate, ample, its branches suberect, 2 dm. long, rather densely flowered but not strobilate, bearing several sterile bracts at the base. Floral bracts broadly ovate, apiculate, entire, 9 mm. long, shorter than the pedicels, cobwebby-tomentose. Flowers erect or nearly so, 4 cm. long, their pedicels stout, 13 mm. long; sepals subelliptic, thick, 2 cm. long, rounded, minutely mucronate, tomentulose; petals twice as long as the sepals, the blade elliptic, glaucous-green.

Rocky places. Cajamarca: Near Huambos, Province of Chota, 2,300–2,500 meters, *Weberbauer 4208*. Endemic.

6. **Puya tuberosa** Mez in DC. Monogr. 9: 483. 1896.

Less than 3 dm. tall. Rhizome short, tuberous-thickened. Leaves 15 cm. long, 3.5 mm. wide, furfuraceous below, the apex filiform, the spines thin, 1 mm. long. Scape glabrous, its bracts ovate-acuminate, lustrous, about equaling the internodes. Inflorescence few-branched, the branches short but exceeding the primary bracts. Floral bracts ovate-acuminate, entire, glabrous, slightly shorter than the pedicels. Pedicels 7–10 mm. long; sepals 9 mm. long, ovate, acute, glabrous.

Indefinite: *Haenke*. Endemic.

7. **Puya oxyantha** Mez, Bull. Herb. Boiss. II. 4: 631. 1904.

At least 1 meter high. Leaves 7 dm. long, 2 cm. wide, densely furfuraceous below with long piliform scales, the spines 5 mm. long. Scape stout, its bracts dense, spinose-serrate, the apex filiform-subulate. Inflorescence bipinnate, subpyramidal, acute, 5 dm. long, its branches slenderly strobilate, 13 cm. long, 10–15-flowered, subspreading. Primary bracts entire, glabrous, the apex long-subulate. Floral bracts ovate, long-aciculose, exceeding the sepals, entire. Flowers subsessile, erect, 45 mm. long, largely concealed by the bracts; sepals 33 mm. long, narrowly triangular, lanate, the apex acicular; petals acute, bluish green.

On rocks. Puno: Between Sandía and Tambo Azalaya, on road from Sandía to Chunchosmayo, 1,500–2,000 meters, *Weberbauer 1058*. Endemic.

8. **Puya ferox** Mez, Bull. Herb. Boiss. II. 4: 632. 1904.

Conspicuous, probably over 1 meter high. Leaves more than 1 meter long, 35–40 mm. wide, glabrous and lustrous above, lepidote between the nerves below, the spines 13 mm. long. Inflorescence bipinnate, ample; racemes slenderly strobilate, long-stipitate, much exceeding the primary bracts. Primary bracts somewhat spreading, thick, coriaceous, entire, glabrous, lustrous. Floral bracts erect, imbricate, slightly shorter than the sepals, ovate-elliptic, entire, acute, glabrous, lustrous, the apex short-aciculose. Flowers 5 cm. long, erect, the pedicels short and thick; sepals subelliptic, 3 cm. long, carinate, obtuse, short-mucronate, lanate, glabrescent; petals bluish green, broad, acute.

In open, brushy and rocky places. Puno: On the road from Sandía to Chunchosmayo, between Tambo Yuncacoya and Ramospata, 2,200–2,400 meters, *Weberbauer 1344*. Endemic.

9. **Puya Weberbaueri** Mez, Bull. Herb. Boiss. II. 4: 633. 1904.

Conspicuous, 1 meter or more high. Leaves 17 mm. wide, acuminate, obscurely lepidote below, the spines 5 mm. long. Scape slender, glabrous, its bracts lax, ovate-triangular, produced into a linear, spinose, stiffly erect blade. Inflorescence amply and laxly bipinnate, 3 dm. long, acute, densely white-lanate, its branches ellipsoid-strobilate, 55 mm. long, subsessile, much exceeding the primary bracts. Primary bracts broadly ovate, acute, reflexed or spreading, lanate, soon glabrous and lustrous, rigidly coriaceous, strongly nerved. Floral bracts erect, imbricate, ovate-elliptic, abruptly acute, entire, exceeding the sepals, soon glabrous and lustrous. Flowers 45 mm. long, with short, thick pedicels; sepals white-lanate, 18 mm. long, carinate, abruptly acute; petals bluish green, the blade large, elliptic, obtuse.

Common on rocks. Puno: Province of Sandía near Cuyocuyo, 3,100 meters, *Weberbauer 847*. Endemic. "Tica."

Killip & Smith 22137, a very immature specimen from near Huancayo, Junín, is doubtfully referred here.

10. **Puya llatensis** L. B. Smith, Contr. Gray Herb. 98: 11. *pl. 3, f. 14–16*. 1932.

Four meters in height. Leaves narrowly triangular, 1 meter long, evenly pale-appressed-lepidote on both sides, becoming glabrous above, the spines 7–8 mm. long. Scape 15 cm. thick at the base (*Macbride & Featherstone!*). Inflorescence compound, its branches

densely strobilate, ovoid or ellipsoid, exceeding the primary bracts. Floral bracts broadly elliptic, acuminulate, entire, densely ferruginous-lanate, about half as long as the sepals, broadly convex, ecarinate. Flowers 7–8 cm. long, the pedicels stout, 15 mm. long; sepals broadly elliptic, 3 cm. long, densely ferruginous-lanate; petals 65 mm. long, the blade elliptic; stamens and pistil included; ovary pyramidal.

Huánuco: Llata, steep canyon slope, 2,300 meters, *2300*. Endemic.

11. **Puya stipitata** L. B. Smith, Contr. Gray Herb. 98: 13. *pl. 4, f. 5–6*. 1932.

About 2 meters high. Leaves narrowly triangular, 5–6 dm. long, 18 mm. wide, glabrous above, covered with a thin, even layer of cinereous scales below, the spines 5–6 mm. long. Scape erect, stout, its bracts foliaceous, elongate. Inflorescence compound, its racemes densely strobilate, 9–10 cm. long, 3 cm. thick, spreading or reflexed, densely pale-lanate throughout, the stipe 20–25 mm. long. Primary bracts narrowly ovate, acute, slightly exceeding the stipe. Floral bracts broadly ovate, abruptly acute, about half as long as the sepals, entire, broadly convex, ecarinate. Flowers 35 mm. long, erect, obscurely stout-pedicellate for 7 mm.; sepals broadly elliptic, obtuse, 2 cm. long; petals blue-green, 28 mm. long; stamens and pistil equaling the petals, the ovary pyramidal.

Rocky grass-shrub hillsides. Huánuco: Cani, pueblo 7 miles northeast of Mito, 2,800 meters, *3436*, *3854*. Endemic.

12. **Puya laccata** Mez, Repert. Nov. Sp. 3: 11. 1906.

Conspicuous, up to 1 meter high. Leaves 4 dm. long, 3 cm. broad, narrowly triangular, subglabrous above, appressed-cinereous-lepidote below, the spines straight, 8 mm. long. Scape slender, glabrous, its bracts dense, broadly ovate, strongly spinose-serrate, glabrous, lustrous, long-caudate. Inflorescence bipinnate, 4 dm. long, densely cylindrical, its branches short but slender, shorter than the primary bracts, laxly 4-flowered. Primary bracts 45 mm. long, ovate, acuminate, pectinate, glabrous, laccate. Floral bracts broadly elliptic, acuminulate, much shorter than the sepals. Flowers 38 mm. long, glabrous, the pedicels 3–4 mm. long; sepals 21 mm. long, linear-elliptic, abruptly acute; petals greenish yellow, the blade broadly elliptic, acute.

Swampy places. Huánuco: Province of Huamalíes, southwestern mountains near Monzón, 3,300–3,500 meters, *Weberbauer 3376*. Endemic.

13. **Puya cylindrica** Mez, Repert. Sp. Nov. 16: 66. 1919.

Stout, 1 meter high; stem thick, decumbent, branching. Leaves narrowly triangular, 5 dm. long, 35 mm. wide, acuminate, pungent, appressed-gray-lepidote throughout, the spines 1 cm. long. Inflorescence bipinnate, densely cylindrical, 4 dm. long, 7–8 cm. broad, densely and finely ferruginous-tomentose throughout. Primary bracts large, broadly ovate, triangular-acute, spinose-serrate, mostly exceeding the axillary racemes. Racemes densely 5-flowered; rachis slender. Floral bracts lance-ovate, acuminate, about equaling the sepals, the lowest ones remotely denticulate. Flowers erect, the pedicels slender, 1 cm. long; sepals lance-triangular, acuminate, 35 mm. long; petals 45 mm. long, bluish green; stamens and pistil slightly exserted.

Arequipa: Province of Unión, near Cotahuasi, 2,500–2,600 meters, *Weberbauer 6873*. Endemic.

14. **Puya longistyla** Mez, Repert. Nov. Sp. 3: 12. 1906.

Stems short, stout, much branched. Leaves spreading, narrowly triangular, 8 dm. long, 25 mm. wide, pungent, glabrous above, appressed-cinereous-lepidote below, the spines 12 mm. long. Scape stout, ascending, its bracts imbricate, broadly ovate, laciniate-spinose, long-caudate, farinose-lepidote. Inflorescence bipinnate, densely cylindric, 5 dm. long, 9 cm. in diameter, finely white-stellate-tomentose throughout, its branches 6-flowered, slender, shorter than the primary bracts. Primary bracts 9 cm. long, 45 mm. wide, broadly ovate, triangular-acute, densely denticulate. Floral bracts lanceolate, acuminate, much shorter than the sepals, somewhat carinate, entire. Flowers erect; pedicels slender, 9-20 mm. long; sepals narrowly triangular, acuminate, 33 mm. long; petals 5 cm. long, glaucous-green; pistil exserted for 6 mm.

Stony slopes. Cuzco: Province of Urubamba, 3,000 meters, *Weberbauer 4916* (type). Near Yucai, 2,900 meters, *Herrera 777*. Endemic. "Achupalla." Used as firewood (*F. L. Herrera!*).

15. **Puya fastuosa** Mez, Repert. Nov. Sp. 3: 12. 1906.

Very conspicuous, 2.5 meters high. Leaves narrowly triangular, 4 dm. long, 3 cm. wide, glabrous above, appressed-gray-lepidote below, the spines 6 mm. long. Inflorescence densely paniculate, cylindric, 1 meter long, 1 dm. in diameter, its branches few-flowered, shorter than the primary bracts, sterile at the extreme apex, the lowest 8 cm. long. Primary bracts ovate, acute, erect or nearly so, laciniate-serrulate, glabrescent except for the lanate base. Floral

bracts 3 cm. long, exceeding the sepals, broadly elliptic, acute, glabrescent, subcoriaceous. Flowers 37 mm. long, the pedicels stout, 7 mm. long; sepals elliptic, subobtuse, thick, 2 cm. long; petals greenish yellow, obtuse, equaling the stamens.

Swamps. Cajamarca: In the northwestern mountains near Hualgayoc, 3,700–3,900 meters, *Weberbauer 4069*. Endemic.

16. **Puya Herrerae** Harms, Notizbl. Bot. Gart. Berlin 10: 792. 1929.

Leaves not known. Scape probably 3–4 dm. long. Inflorescence compound, cylindric, 3–4 dm. long, its branches few-flowered, dense, 5–7 cm. long, covered by the primary bracts. Primary bracts broadly ovate, entire, acute, imbricate. Floral bracts broadly ovate, acuminulate, 40–45 mm. long, 25 mm. wide, densely villous. Flowers with short, thick pedicels; sepals oblong, obtuse or subacute, 25 mm. long; petals 50–55 mm. long.

Cuzco(?): Valle del Apurímac, Hacienda Paucarcoto, 3,000 meters, *Herrera 1965*. Endemic. "Ccjayara."

17. **Puya depauperata** L. B. Smith, Contr. Gray Herb. 98: 10. *pl. 3, f. 10–11*. 1932.

About 5 dm. high. Leaves narrowly triangular, 4 dm. long, 3 cm. broad, glabrous above, very finely appressed-lepidote below, the spines 6 mm. long. Scape erect, slender, its bracts dense, foliaceous, coarsely spinose-serrate. Inflorescence dark purple, densely and finely appressed-lepidote, consisting of a single terminal strobilate raceme 15 cm. long and two short, almost bud-like branches at its base. Primary bracts (below the short branches) suborbicular, apiculate, largely concealing the axillary raceme, entire. Floral bracts ovate or elliptic, apiculate, exceeding the sepals. Flowers erect, 40–45 mm. long, the pedicels stout, obconic, up to 1 cm. long; sepals oblanceolate, acute, 25 mm. long; petals lurid green, fading to purple (*Macbride & Featherstone!*), 37 mm. long, the blade not distinct; stamens and pistil included, the ovary pyramidal.

Shrubby, rocky canyon side. Junín: Cabello, hacienda 9 miles above Huertas, 2,700 meters, *1339*. Endemic.

18. **Puya pyramidata** (R. & P.) Schult. f. in R. & S. Syst. Veg. 7: 1235. 1830. *Pourretia pyramidata* R. & P. Fl. 3: 34, *pl. 257*. 1802. *Pitcairnia pyramidata* Pers. Syn. Pl. 1: 344. 1805. *Bromelia pyramidata* Beer, Brom. 34. 1857.

One meter or less in height. Leaves narrowly triangular, about 2 dm. long, 2–3 cm. broad, rigid, pungent, glabrous on both sides, the spines black, 3–4 mm. long, erect. Scape erect, much exceeding the leaves, glabrescent, its bracts densely imbricate, making a very gradual transition between the leaves and floral bracts. Inflorescence racemose, at first dense and pyramidal, later elongate, cylindric, glabrous. Bracts ovate, acuminate, spinose-serrate, much exceeding the sepals. Flowers pedicellate, spreading to reflexed; sepals ovate, acute, 18 mm. long; petals yellowish green, acute, more than twice as long as the sepals.

Clearings, open sphagnum uplands. Huánuco: Mountains, Chinchao to Macora, *Ruiz & Pavón*. Chavín to Monzón, *Ruiz & Pavón*. Playa-pampa, 3,000 meters, *4891*. Endemic.

Lechler 3131 collected near Sachapata has been referred to this species, but the specimen is very old and defective and shows no spines on the bracts, so that the determination is probably erroneous.

19. **Puya mitis** Mez, Repert. Nov. Sp. 3: 10. 1906.

Slender, 7 dm. high. Leaves entire throughout, 15 cm. long; sheaths persistent, forming an ellipsoid bulb; blade 5 mm. wide, narrowly triangular, subulate-involute. Scape slender, erect, its lower bracts long-caudate, entire, its upper bracts ovate-acute, serrulate. Inflorescence simple, 2 dm. long, 15-flowered, glabrous, laxly racemose. Bracts broadly ovate-elliptic, entire or the lowest minutely serrulate, shorter than the sepals. Flowers nodding at anthesis, later erect, 32 mm. long, the pedicels 15 mm. long; sepals 16 mm. long, elliptic, obtuse; petals greenish yellow, obtuse, tubular-erect; stamens and pistil included.

Junín: Province of Tarma, in the mountains east of Huacapistana, 3,000-3,100 meters, *Weberbauer 2094*. Endemic.

20. **Puya lanuginosa** (R. & P.) Schult. f. in R. & S. Syst. Veg. 7: 1234. 1830. *Pourretia lanuginosa* R. & P. Fl. 3: 33. *pl. 256*. 1802. *Bromelia lanuginosa* Beer, Brom. 32. 1857. *Pitcairnia crystallina* Pers. Syn. Pl. 1: 344. 1805. *Puya Ruiziana* Mez in DC. Monogr. 9: 491. 1896, as to material cited.

Over 1 meter high. Leaves densely imbricate, narrowly triangular, glabrous, spinulose-serrate. Scape erect, its bracts foliaceous. Inflorescence simple, subspicate, large. Bracts broadly ovate, acute, much shorter than the sepals, lanate, finally reflexed at the apex. Flowers imbricate, 6 cm. long, subsessile; sepals

broadly ovate, 30–35 mm. long, cinereous-lanate; petals greenish, purple on withering, spreading to reflexed at the apex.

Woods and hills, or rocky clearings. Huánuco: Posuso, Panao, Acomayo, *Ruiz & Pavón.*—Junín: Pillao, *Ruiz & Pavón.* Endemic.

21. **Puya Macbridei** L. B. Smith, Contr. Gray Herb. 98: 12. *pl. 3, f. 17–18.* 1932.

About 1 meter high. Leaves narrowly triangular, 7–8 dm. long, 25 mm. wide, glabrous above, minutely appressed-lepidote below, the apex long-caudate, the spines stout, dark brown, hooked, 6 mm. long. Scape erect, terete, glabrous, its bracts deciduous. Inflorescence elongate, laxly racemose, finely cinereous-tomentose throughout. Bracts narrowly lanceolate, acuminate, mostly shorter than the pedicels, thick, reflexed. Flowers erect or suberect, the pedicels rather stout, enlarged upward, 2 cm. long; sepals narrowly lanceolate, 35 mm. long, 7 mm. broad; petals 6 cm. long, spirally twisted.

Gravel river bluffs. Ancash: Recuay, 3,000 meters, *2516.* Endemic.

22. **Puya reflexiflora** Mez, Repert. Sp. Nov. 16: 66. 1919. *P. stenostele* Harms, Notizbl. Bot. Gart. Berlin 11: 57. 1930.

About 1 meter high; stem prostrate, branching, thick. Leaves rigid, narrowly triangular, acuminate, 8 dm. long, 37 mm. wide, appressed-gray-lepidote below, the spines stout, hooked, dark brown, 5 mm. long. Scape stout, erect, its bracts broadly lanceolate, acuminate, 4–5 cm. long. Inflorescence racemose, 6 dm. long, 9 cm. in diameter, subcylindric, dense above and lax below; axis, pedicels, and sepals densely cinereous-lanate. Bracts broadly ovate or lanceolate, acute or acuminate, at first about equaling the sepals but at maturity not reaching beyond their mid-point, entire, thick, coriaceous. Flowers spreading or reflexed at anthesis, the pedicels stout, 1 cm. long; sepals narrowly ovate, obtuse or apiculate, 25–35 mm. long, 16 mm. broad; petals 6 cm. long, tubular-erect, blue-green, the blade broadly lanceolate, acute.

Rocky places. Ancash: Below Hacienda Cajabamba, between Samanco and Caraz, 3,300–3,400 meters, *Weberbauer 3148.* Endemic.

23. **Puya dolichostrobila** Harms, Notizbl. Bot. Gart. Berlin 10: 215. 1928.

Caulescent, decumbent, branching. Leaves linear-lanceolate, acuminate, 5–6 dm. long, 4–5 cm. wide, glabrous above, minutely puberulent below, the spines stout, dark brown. Inflorescence 4

dm. long, slender, dense. Bracts imbricate, lance-ovate, acuminate, up to 5 cm. long, 15–20 mm. broad, entire or sparsely denticulate, villous below, glabrescent above. Flowers ferruginous-tomentose throughout, the pedicels about 1 cm. long; sepals lanceolate, acute, 33 mm. long; petals 6 cm. long, greenish yellow.

Stony slopes, open xerophytic formation. Libertad: Province of Otuzco, left bank of the Río de Chicama below Hacienda Membrillal, 1,400 meters, *Weberbauer 6981*. Endemic.

24. **Puya isabellina** Mez, Repert. Sp. Nov. 16: 66. 1919.

Stem decumbent, 8–10 cm. thick. Leaves decurved, rigid, 3 dm. long, 4 cm. wide, acuminate, the spines 8 mm. long. Inflorescence densely cylindric, subspicate, 3 dm. long, 1 dm. in diameter. Bracts elliptic, acuminate or apiculate, minutely furfuraceous, 35 mm. long, about equaling the sepals, the upper ones subobtuse, somewhat spreading. Flowers 5 cm. long, short-pedicellate, suberect, isabelline; sepals 24 mm. long, acute, furfuraceous.

Cajamarca: Province of Hualgayoc, below Santa Cruz, *Weberbauer 4144*. Endemic.

25. **Puya macrura** Mez, Repert. Nov. Sp. 3: 13. 1906.

Stem 8–10 cm. thick, decumbent, branching. Leaves rosulate, recurved, rigid, narrowly triangular, 4 dm. long, 35 mm. broad, appressed-white-lepidote throughout, the spines stout, hooked, dark brown, 9 mm. long. Scape stout, erect, exceeding the leaves, densely white-lanate, its bracts glabrous, exceeding the internodes, ovate, the lower caudate, the upper acute. Inflorescence densely subspicate, attenuate-cylindric, 35 cm. long, 5 cm. in diameter; axis thick, densely white-lanate. Bracts ovate, acuminate, entire, 4 cm. long, exceeding the sepals, erect or nearly so, brown, pergamentaceous, aciculose-pungent, glabrous, strongly nerved. Flowers subsessile, 47 mm. long; sepals 26 mm. long, triangular, acuminate, densely white-lanate; petals dark violet, tubular-erect, exceeding the pistil and stamens.

Rocky places. Ancash: Near Caraz, 2,200–2,500 meters, *Weberbauer 3022*. Endemic.

26. **Puya lanata** (HBK.) Schult. f. in R. & S. Syst. Veg. 7: 1233. 1830. *Pourretia lanata* HBK. Nov. Gen. & Sp. 1: 296. 1816. *Pitcairnia lanata* Dietr. Lexicogr. Nachtr. 6: 303. 1820.

Up to 3 meters high. Stem erect, elongate. Leaves 5 dm. long or longer, narrowly triangular, pungent, about 35 mm. wide, coarsely

spinose-serrate, punctulate-lepidote above, densely white-appressed-lepidote below. Inflorescence simple, densely cylindric, 4 dm. long, 1 dm. in diameter; rachis stout, densely lanate. Bracts narrow, sub-lanceolate, entire, about equaling the flowers, ferruginous-lanate, pungent. Flowers 55 mm. long, suberect, the pedicels very short, obconic; sepals narrowly triangular, 35 mm. long, aristate, lanate; petals rounded-apiculate, greenish white; stamens included.

Cajamarca: Between Cajamarca and Magdalena, 350 meters, *Humboldt & Bonpland.* Endemic.

27. **Puya gracilis** L. B. Smith, Contr. Gray Herb. 98: 11. *pl. 3, f. 12–13.* 1932.

About 8 dm. high. Leaves narrowly triangular, 6–7 dm. long, 18 mm. broad, ferruginous-lepidote, furfuraceous, the spines slender, hooked, 7 mm. long. Scape erect, glabrous, 5 mm. in diameter, its bracts remote, ovate, spinulose-serrate, the lowest ones long-caudate. Inflorescence slenderly racemose, 35 cm. long, minutely stellate-lepidote throughout. Bracts membranaceous, ovate, apiculate, mostly shorter than the sepals. Flowers erect or suberect, slender, the pedicels slender, 5–7 mm. long; sepals narrowly ovate, acuminate, 3 cm. long; petals tubular-erect, about equaling the stamens; pistil exserted.

Indefinite: *Weberbauer 6474.* Endemic.

28. **Puya strobilantha** Mez, Repert Nov. Sp. 3: 13. 1906.

Probably 1 meter high, stout. Leaves rigid, narrowly triangular, 9 dm. long, 25 mm. wide, glabrous and lustrous above, appressed-lepidote below, the spines 6 mm. long. Inflorescence subspicate, ellipsoid, strobilate, many-flowered, 14 cm. long, 6 cm. in diameter. Bracts densely imbricate, broadly ovate, acute, entire, stellate-puberulent, soon glabrous, lustrous, brown, exceeding the sepals, 4 cm. long, 3 cm. broad. Flowers erect or nearly so, the pedicels very short and thick; sepals 25 mm. long, linear-elliptic, obtuse, thick.

Rocky places. Junín: Province of Tarma, near Palca on the road above Huacapistana, 2,000–2,100 meters, *Weberbauer 2050.* Endemic.

29. **Puya Raimondii** Harms, Notizbl. Bot. Gart. Berlin 10: 213. 1928. *Pourretia gigantea* Raimondi, El Perú 1: 297. 1874, not *Puya gigantea* Phil. 1865, nor *P. gigantea* André, 1879.

Columnar, 9.5 meters high. Trunk 4 meters high, 6 dm. in diameter, surmounted by the dense leaf rosette. Leaves many, 1–1.25 meters long, subglabrous; sheath 15 cm. broad; blade narrowly triangular, pungent, the spines curved, dark brown, 1 cm. long. Inflorescence compound, scapose, 4.3 meters long, 6 dm. thick, slenderly cylindric, attenuate, lanate throughout; branches spreading or reflexed, densely racemose, sterile toward the apex. Floral bracts densely imbricate, ovate-lanceolate, acuminate, membranaceous, subglabrescent, exceeding the sepals. Flowers stout-pedicellate. Sepals lanceolate, acute, 4 cm. long. Petals 6–8 cm. long, greenish white, often purplish, the blade broad. Capsule globose-ovoid. Seed, including its irregular circumferential wing, 3–5 mm. broad.

Steep, rocky slopes. Ancash: Huaraz, vicinity of Aija, 4,000 meters, *Weberbauer 2955*. Cordillera Negra, vicinity of Huaraz, 3,800 meters, *Weberbauer 3746*. Western slopes, Pomopampa, 30 miles east of Huaraz, 4,000 meters, *2496*. Bolivia. "Cunco," "junco," "llakuash." The largest and most striking member of the *Bromeliaceae*. Used for timbers in roofs (*Macbride!*).

EXCLUDED SPECIES

Puya Pearcei (Bak.) Mez was formerly attributed to Peru, but is now proved to have been collected in Bolivia.

2. LINDMANIA Mez

Slender herbs. Leaves entire or remotely serrate. Scape erect, slender. Inflorescence a lax panicle, twice or thrice pinnate; floral bracts small. Flowers minute, whitish or green. Sepals free, scale-like. Petals twice as long as the sepals, free, naked. Ovary superior, glabrous, the style slender, equaling the stamens. Capsule septicidal or loculicidal. Seeds narrowly fusiform, with narrow dorsal wing caudate-produced at the ends.—Eleven species. Terrestrial. Chiefly Andean with outlying species in Mexico, Salvador, Guiana, and Argentina. Type species: *L. guianensis* Mez.

Flowers neither secund nor nutant.....1. *L. petiolata.*

Flowers secund or nutant, usually both.

Flowers not more than 5 mm. long.

Leaf blades entire.....2. *L. Weberbaueri.*

Leaf blades serrulate toward the base.....3. *L. Rusbyi.*

Flowers 8–9 mm. long.....4. *L. penduliflora.*

1. **Lindmania petiolata** Mez, Bull. Herb. Boiss. II. 4: 864. 1904.

Slender, 1 meter high. Leaves many, fasciculate, entire, the outer scale-like, the inner narrowed into a grooved petiole 35 mm. long above the short, triangular sheath; blade narrowly lanceolate, acuminate, 4 dm. long, 35 mm. wide, submembranaceous, densely pale-lepidote below. Scape slender, strict, cobwebby-tomentose then glabrous, its bracts membranaceous, narrowly lanceolate, much exceeding the internodes. Inflorescence narrow, tripinnate, subglabrous, 25 cm. long, 3 cm. in diameter; primary branches elongate, the ultimate branches in the form of ellipsoid heads in the axils of large, lanceolate, membranaceous bracts. Floral bracts broadly lanceolate, acute, slightly exceeding the pedicels. Flowers greenish white, suberect to spreading, 4 mm. long, glabrous, the pedicels 1.5 mm. long; sepals elliptic, narrowly obtuse, 2.5 mm. long; petals broadly elliptic, emarginate; stamens free, the anthers obtuse at both ends, 1.75 mm. long; style stout, equaling the ovary.

Woods. Puno: Near Tambo Isilluma, on the road between Sandía and Chunchosmayo, 1,000 meters, *Weberbauer 1210*. Endemic.

2. **Lindmania Weberbaueri** Mez, Repert. Sp. Nov. 12: 417. 1913. *Cottendorfia Rusbyi* Baker, Bull. Torrey Club 29: 697. 1902, not *Lindmania Rusbyi* Mez, 1901.

Up to 9 dm. high. Leaves about 10, laxly rosulate, entire, constricted above the sheath but not definitely petiolate, broadly lanceolate, acuminate, 25 cm. long, 4 cm. wide, membranaceous, glabrous, light green (when dried). Scape slender, erect, glabrous, its bracts shorter than the internodes, entire. Inflorescence laxly bipinnate, glabrous, many-flowered, 3 dm. long, 75 mm. in diameter, its branches curved-ascending, slender, 8 cm. long, laxly flowered. Floral bracts ovate, acute, 1.5 mm. long, slightly shorter than the pedicels, erect. Flowers nodding, rather obscurely secund, 5 mm. long, white; sepals subtriangular, obtuse, half as long as the petals; petals subelliptic, acute, erect at anthesis; stamens included.

Tropical rain forest. Ayacucho: Province of Huanta, by the Río Pieni, *Weberbauer 5635* (type). Junín: La Merced, 700 meters, *5352*. Río Paucartambo Valley, near Perené Bridge, 700 meters, *Killip & Smith 25326*. Bolivia.

3. **Lindmania Rusbyi** Mez, Bot. Jahrb. 30: Beibl. 67: 6. 1901.

Slender, 5–9 dm. high. Leaves 5 dm. long, constricted above the sheath but not definitely petiolate, 25 mm. wide, linear-lanceo-

late, filiform-acuminate, thin, pale green and glabrous above, densely white-lepidote below, somewhat dimorphic with the narrower leaves distinctly, the broader ones obscurely serrate just above the sheath. Scape slender, erect, glabrous, its bracts entire, all but the uppermost exceeding the internodes and with long, filiform-acuminate apices. Inflorescence laxly bipinnate or tripinnate, glabrous, many-flowered, 3 dm. long, its branches curved-ascending, slender, laxly 8–15-flowered. Floral bracts broadly ovate, acute, 1–2 mm. long, membranous. Flowers nodding, secund, 3–4 mm. long; sepals ovate, 2 mm. long; petals narrowly elliptic, soon recurved.

Cuzco: Pumachaca, Santa Ana Valley, 1,400 meters, *Herrera 3316*. Bolivia.

4. **Lindmania penduliflora** (C. H. Wright) Stapf, Bot. Mag. 150: *pl. 9029*. 1924. *Catopsis penduliflora* C. H. Wright, Kew Bull. Misc. Inf. 197. 1910.

Leaves rosulate, linear-lanceolate, with a soft, narrow apex, 25 cm. long, 35 mm. wide, thin, glabrous above, sparingly scurfy below. Scape slender, glabrous, its bracts lanceolate, acuminate, entire, the upper remote. Inflorescence laxly paniculate, 2 dm. long, its branches simple, or the lowest branched and 2 dm. long. Primary bracts like the upper scape bracts, 5–10 mm. long, hyaline. Floral bracts ovate-acuminate, 1–1.5 mm. long, thin, green. Flowers secund, nodding, the pedicels 2, rarely 3 mm. long; sepals lanceolate, acute, 3.5 mm. long, green with white margins; petals lance-oblong, 8–9 mm. long, over 2 mm. broad, white; stamens included.

Indefinite: *Forget*, in a lot of living plants from Peru. Argentina, Bolivia.

3. DEUTEROCOHNIA Mez

Shrubby perennials. Leaves densely rosulate, rigid, narrowly triangular, coarsely serrate, with a membrane of whitish scales below or on both sides. Scape woody. Inflorescence paniculate, 2–4-pinnate, its branches polystichous-flowered, developing from the buds in the axils of the persistent bracts. Flowers sessile or pedicellate, showy. Sepals free. Petals erect, regular, each with a single large scale at the base. Stamens free. Ovary superior, glabrous. Capsule septicidal. Seeds brown, with a dorsal wing.—Six species. Xerophytic plants of the eastern slopes of the Andes. Type species, *D. longipetala* (Baker) Mez.

1. **Deuterocohnia longipetala** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 507. *pl. 95*. 1894. *Dyckia longipetala* Baker, Brom. 135.

1889. *D. decomposita* Baker, Brom. 136. 1889. *Puya flava* Willd. ex Baker, Brom. 135. 1889, nomen.

Leaves 3 dm. long, the apex produced into a long, whip-like, entire point, the spines 3–4 mm. long. Scape glabrous, its upper bracts shorter than the internodes. Inflorescence many-flowered, its branches laxly flowered. Floral bracts broadly ovate, abruptly acute. Flowers erect, sessile, 25 mm. long; sepals 8–10 mm. long, strongly asymmetric, obliquely truncate; petals yellow with a green spot at the apex.

Cajamarca: Between Trembladera and Llallan, on the road from the coast to Cajamarca, *Weberbauer 3781*.—Amazonas: Province of Luya, valley of the Río Marañón, Tupen, 800 meters, *Weberbauer 4798*. Brazil, Argentina.

4. PITCAIRNIA L'Hér.

Mostly stemless herbs, but a few species definitely caulescent. Leaves fasciculate or imbricate and many-ranked along a stem, entire or spinose-serrate, the sheath small, often bulbous-thickened, the blade linear to lanceolate or obovate with a definite petiole or narrowly triangular, sometimes dimorphic with some blades reduced to horny, spinulose-serrate spines. Inflorescence simple or compound. Sepals free. Petals free, usually slightly zygomorphic, naked or with a single triangular scale at the base or with 2 vertical or oblique calli. Stamens free, included or rarely exserted, the anthers linear, versatile. Ovary usually partly inferior, but the greater part superior, the style filiform. Ovules many. Capsule septicidal in the Peruvian species. Seeds caudate-appendaged at both ends or rarely with a dorsal or dorso-apical wing.—About 180 species. Terrestrial or saxicolous, rarely epiphytic. Mexico and the Antilles south to northern Argentina. Type species, *P. bromeliaefolia* L'Hér.

Petals each with a single scale or ligule at the base, or this becoming 2 oblique calli by recession of the point.

Leaf blades 6–10 cm. broad, distinctly petiolate.

Inflorescence pendulous or trailing; flowers secund.

1. *P. corallina*.

Inflorescence erect; flowers erect.

Sepals mucronulate, carinate; petals violet. 2. *P. cyanopetala*.

Sepals entire at the apex, ecarinate; petals red.

3. *P. Sprucei*.

Leaf blades not more than 45 mm. broad at most, rarely petiolate.
Floral bracts equaling or exceeding the pedicels.
Leaves dimorphic, the outer ones reduced to serrate spines.
Sepals acute; inflorescence simple.
Sepals wing-keeled.
Blades of the functional leaves spinulose-serrate. 4. *P. eximea.*
Blades of the functional leaves entire..5. *P. Augusti.*
Sepals convex or merely keeled, the keels not produced into wings.
Blades of the functional leaves entire..6. *P. pungens.*
Blades of the functional leaves spinulose-serrate. 7. *P. lanuginosa.*
Sepals obtuse-mucronulate; inflorescence paniculate. 8. *P. Lechleri.*
Leaves all alike.
Sepals acuminate; inflorescence ample..9. *P. cassapensis.*
Sepals emarginate; inflorescence simple or few-branched. 10. *P. rigida.*
Floral bracts much shorter than the pedicels.
Sepals acute or acuminate, lanceolate.
Sepals 15–18 mm. long.....11. *P. paniculata.*
Sepals only 6 mm. long.....12. *P. pulverulenta.*
Sepals obtuse or truncate.
Inflorescence simple.....13. *P. subpetiolata.*
Inflorescence paniculate.
Inflorescence thyrsoid with the primary bracts nearly or quite equaling the axillary branches..14. *P. inermis.*
Inflorescence pyramidal with the primary bracts much shorter than the axillary branches.
Pedicels 12 mm. long; sepals glabrous. 15. *P. tarapotensis.*
Pedicels 6 mm. long; sepals densely white-furfuraceous. 16. *P. truncata.*
Petals naked, or with 2 vertical calli.
Inflorescence simple, racemose or spicate.
Floral bracts shorter than the pedicels..17. *P. brevicalycina.*

Floral bracts equaling or exceeding the pedicels, or the flowers sessile.

Flowers definitely pedicellate.

Sepals obtuse or obtuse-mucronate.

Flowers strict, polystichous.....18. *P. straminea.*

Flowers spreading, secund.....19. *P. viridis.*

Sepals acute or acuminate.

Leaves definitely petiolate, 7 cm. wide.

20. *P. sceptriformis.*

Leaves not petiolate, much narrower.

Leaves all alike, strongly serrate....21. *P. grandiflora.*

Leaves dimorphic, the broader ones entire.

22. *P. scandens.*

Flowers sessile; floral bracts nearly equaling the sepals.

23. *P. Poeppigiana.*

Inflorescence compound, paniculate.

Sepals glabrous or minutely tomentose-lepidote, but not stellate-lepidote.

Leaves serrate, at least at the base.

Floral bracts much shorter than the pedicels.

Scape stout; sepals 24 mm. long.....24. *P. puyoides.*

Scape slender; sepals 12 mm. long.15. *P. tarapotensis.*

Floral bracts about equaling the pedicels.25. *P. cuzcoensis.*

Leaves entire.....26. *P. Ruiziana.*

Sepals covered with a dense stellate ferruginous tomentum.

27. *P. ferruginea.*

1. **Pitcairnia corallina** Linden & André, Belg. Hort. 23: 112. 1873.

Leaves dimorphic, the outer ovate, acute, scale-like, the inner petiolate, entire except for the petiole, the blade elongate-lanceolate, acute or acuminate, strongly plicate-nerved, up to 1 meter long and 1 dm. wide, glabrous above, densely and finely white-lepidote below. Scape pendulous, stout, coral-red, its bracts green, ovate, acuminate, usually exceeding the internodes. Inflorescence simple, racemose, densely many-flowered, trailing on the ground; axis stout. Bracts lanceolate, much exceeding the pedicels. Flowers secund, coral-red, 75 mm. long, the pedicels about 1 cm. long; sepals subtriangular,

acute, 26 mm. long; petals appendaged, red with a narrow whitish margin; ovary about one-half superior.

Abundant in open places in the lowlands. Loreto: Balsapuerto, 220 meters, *Klug 3018*.—San Martín: Tarapoto, 250 meters, *Williams 6062*; *Ule 6316*. Alto Río Huallaga, 120–300 meters, *Williams 6564*. Colombia.

2. **Pitcairnia cyanopetala** Ule, Verh. Bot. Ver. Brandenb. 48: 139. 1907.

Up to 8 dm. high. Leaves persistent; sheath short; petiole distinct, entire, grooved, 5 dm. long; blade 6 dm. long, 8 cm. broad, narrowly oblanceolate, subglabrous, the apex acuminate, minutely spinulose. Scape erect, its sheaths acuminate, exceeding the internodes. Inflorescence laxly racemose, sparingly furfuraceous. Floral bracts oblanceolate, acuminate, purple, exceeding the pedicels but much shorter than the sepals. Flowers, including the slender pedicel 15–18 mm. long, up to 8 cm. long; sepals ovate, acuminate, 25 mm. long, 7 mm. broad, slightly carinate, lepidote; petals narrowly lingulate, acute, violet, bearing a scale at the base; stamens slightly shorter than the petals; pistil 5 cm. long, the ovary 5 mm. long.

Terrestrial. Loreto: Cerro de Escalera, 1,400 meters, *Ule 6608*. Endemic.

3. **Pitcairnia Sprucei** Baker, Journ. Bot. 19: 303. 1881.

The Peruvian specimens as here noted are larger throughout than the type but do not differ in essential form. Leaves dimorphic, some triangular, scale-like, others elongate and definitely petiolate; sheath ovate; petiole slender, grooved, sparingly serrate toward the base; blade up to 5 dm. long and 9 cm. broad, lanceolate, tapering at both ends, minutely serrate especially toward the apex, glabrous above, minutely appressed-white-lepidote below. Scape erect, its bracts narrowly lanceolate, acuminate, sparingly appressed-lepidote. Inflorescence simple, racemose. Floral bracts like the scape bracts, much exceeding the pedicels. Flowers slender, suberect to spreading, the pedicels slender, 10–18 mm. long; sepals narrowly oblong, red, slightly asymmetric, obtuse, glabrous, 18–25 mm. long; petals red, appendaged, 5–6 cm. long; ovary more than half superior.

Forests. Loreto: Tierra Doble on the Río Nanay, *Williams 1052*. Timbuchi on the Río Nanay, *Williams 1040*. Santa Ana on the upper Río Nanay, *Williams 1241*. Manfinfa on the upper Río Nanay, *Williams 1171*. Brazil. "Bijanillo."

4. **Pitcairnia eximea** Mez, Repert. Nov. Sp. 3: 5. 1906.

Leaves dimorphic, some reduced to linear, brown, serrate spines, others foliaceous, linear, scarcely or not at all narrowed above the sheath, 1 meter long, 3 cm. wide, spinulose-serrate throughout, cobwebby-tomentose when young, becoming glabrous. Scape stout, erect, its bracts foliaceous, elongate, spinulose, exceeding the internodes. Inflorescence simple, racemose, lax, at least at the base, subcylindric, 4 dm. long, furfuraceous. Bracts elliptic-lanceolate, much exceeding the pedicels, deflexed with the flowers after anthesis, pergamentaceous, 4 cm. long, cobwebby-tomentose, becoming glabrous. Flowers up to 12 cm. long, the pedicels 1 cm. long; sepals triangular, acuminate, 46 mm. long, wing-keeled; petals appendaged, greenish white, acute; ovary three-fourths superior.

Junín: Province of Tarma, above Huacapistana on the Palca road, 1,900–2,000 meters, *Weberbauer 2025*. Endemic.

5. **Pitcairnia Augusti** Harms, Notizbl. Bot. Gart. Berlin 10: 211. 1928.

Up to 2 meters high. Leaves linear-lanceolate, about 3 dm. long and 3 cm. wide, glabrous, pungent, entire. Scape stout, elongate, its bracts long-acuminate, sparingly spinulose or subentire. Inflorescence simple, racemose, about 3 dm. long. Floral bracts lanceolate, acuminate, up to 35 mm. long, glabrous or nearly so, exceeding the pedicels. Pedicels up to 13 mm. long; sepals lanceolate, acute, alate-carinate, 33 mm. long; petals 75 mm. long, linear, appendaged, yellowish white.

Libertad: Province of Pataz, drainage of the Mixiollo, one of the left tributaries of the Huallaga, 2,200–2,300 meters, *Weberbauer 7074*. Endemic.

6. **Pitcairnia pungens** HBK. Nov. Gen. & Sp. 1: 294. 1816. *P. laevis* Willd. ex Schult. f. in R. & S. Syst. Veg. 7: 1249. 1830. *P. concolor* Baker, Journ. Bot. 19: 269. 1881.

Rarely more than 4 dm. high, the base often appearing somewhat bulbous. Leaves dimorphic, some persistent and reduced to brown serrate spines, others deciduous above the sheath, green, linear, 3 dm. long, 15 mm. wide, entire except for the persistent base. Scape erect, its bracts acuminate, pungent, soon glabrous. Inflorescence simple, racemose, usually few-flowered, tomentose-lepidote. Floral bracts subovate, entire, acuminate-mucronate, exceeding the pedicels. Flowers erect at anthesis, 55 mm. long, yellowish red, the

pedicels up to 1 cm. long; sepals 25 mm. long, acuminate, carinate; petals bearing a large emarginate scale at the base, about equaling the stamens; ovary almost wholly superior.

Cajamarca: San Pablo, *Weberbauer 3853.*—Huánuco: Near Muña, *Pearce 201, 377.* Rock outcrop crevices, Piedra Grande, near Río Santo Domingo, 1,600 meters, *3669.*—Lima: Near Canta, *Maclean.* Open hillside, Río Blanco, 3,000–3,500 meters, *Killip & Smith 21661.* Moist eastern slope, Matucana, ca. 2,600 meters, *460.* Same, crevices of perpendicular rock cliffs, *2935.* Huariquiña to Matucana, *Weberbauer 76.* Tambo de Viso, *Weberbauer 76a.*—Indefinite: *Grisar.* Colombia, Ecuador.

7. **Pitcairnia lanuginosa** R. & P. Fl. 3: 35. *pl. 258.* 1802. *Puya Ruiziana* Mez in DC. Monogr. 9: 491. 1896, as to synonymy cited but not as to specimen.

Over 1 meter high. Leaves dimorphic, some reduced to dark serrate spines, others foliaceous, linear, acuminate, scarcely if at all narrowed above the base, spinulose-serrate except for the extreme apex, gray-lanuginose below. Scape erect, stout, its bracts rather remote, subtriangular, long-caudate. Inflorescence simple, laxly racemose, incanous-lepidote. Floral bracts lanceolate, acuminate, equaling or exceeding the pedicels. Flowers pedicellate, suberect; sepals ovate, acute, convex or slightly carinate; petals linear, appendaged, pale violet, three times as long as the sepals; stamens and pistil included; ovary almost wholly superior.

On rocks in woods. Huánuco: Near Posuso, *Ruiz & Pavón.* Endemic.

8. **Pitcairnia Lechleri** Baker, Journ. Bot. 19: 269. 1881.

Leaves dimorphic, the outer ones dark brown, persistent, almost spine-like, spinose-serrate, the inner ones deciduous, not at all narrowed above the base, linear, 4 dm. long, 2 cm. wide, acuminate, entire above the persistent spinulose base. Scape stout, erect, subglabrous, its bracts narrowly triangular, aciculose-pungent, equaling or exceeding the internodes, the lower ones spinulose-serrate at the base. Inflorescence paniculate, pyramidal, glabrous, 4 dm. long or more, its lower branches about 15 cm. long, with lower half sterile and upper half densely flowered. Floral bracts narrowly lanceolate, acuminate, exceeding the pedicels or even the lowest flowers. Flowers somewhat secund, spreading, the pedicels slender, 6 mm. long; sepals 12 mm. long, obtuse-mucronulate, ecarinate; petals ligulate-appendaged.

Puno: Eastern slopes of the Andes near Sachapata, *Lechler 3132*. Endemic.

9. **Pitcairnia cassapensis** Mez, Repert. Sp. Nov. 16: 8. 1919.

Leaves homomorphic, persistent, narrowed above the sheath but not truly petiolate, linear, 1–1.5 meters long, 45 mm. wide, entire, white-lepidote below when young, becoming glabrous. Inflorescence laxly and amply paniculate, gray-pulverulent throughout, its branches 15 cm. long, laxly 4–12-flowered. Floral bracts elliptic, acuminulate, 15 mm. long, about equaling the slender pedicels. Flowers crimson, 55 mm. long; sepals 22 mm. long, triangular, acuminate, carinate; petals acute, ligulate-appendaged, exceeding the stamens; ovary more than half superior.

Huánuco: Casapí, near Cochero, *Poeppig 1526* (type).—Indefinite: *Mathews 2089*. Endemic.

10. **Pitcairnia rigida** Mez, Bull. Herb. Boiss. II. 4: 625. 1904.

About 5 dm. high. Leaves all alike, fasciculate, deciduous, entire above the persistent, spinose-serrate base, linear, not at all petiolate, 21 cm. long, 9 mm. wide, glabrous throughout at maturity. Scape slender, erect, soon glabrous, its bracts lanceolate, acuminate, entire, slightly exceeding the internodes. Inflorescence a depauperate panicle, 21 cm. long, scantly furfuraceous, its basal branches 2–5-flowered, subsecund. Floral bracts narrowly triangular, acuminate, equaling or exceeding the pedicels except near the apex where reduced. Flowers spreading or reflexed, 4 cm. long, glabrous, the pedicels slender, 5 mm. long; sepals 12 mm. long, oblong, emarginate, slightly carinate; petals red, appendaged, exceeding the stamens; ovary more than half superior.

In shrubby growth. Puno: Above Tambo Cochicachi, *Weberbauer 1303*. Endemic.

11. **Pitcairnia paniculata** R. & P. Fl. 3: 36. *pl. 260*. 1802. *Pourretia paniculata* R. & P. Syst. 1: 81. 1798. *Pitcairnia longifolia* Hook. Bot. Mag. 80: *pl. 4775*. 1854. *P. excelsa* E. Morr. Belg. Hort. 25: 381. 1875. *P. fruticetorum* Mez, Repert. Nov. Sp. 3: 4. 1906. *P. biattenuata* Rusby, Bull. N. Y. Bot. Gard. 4: 457. 1907.

Two meters or more high; stem stout, erect, ringed with leaf scars. Leaves densely fasciculate, dimorphic or trimorphic, the outer ones reduced, scale-like or some with setiform, spinose blades, the inner elongate, contracted above the sheath but not always petiolate, up to 1.5 meters long, 35 mm. broad, remotely spinulose-

serrate, acuminate, glabrous above, scantly furfuraceous below. Scape white-furfuraceous, its bracts narrowly triangular, filiform-caudate, the uppermost about equaling the internodes. Inflorescence laxly paniculate, pyramidal, 5 dm. long or more; axis furfuraceous; branches suberect to spreading, secundly many-flowered. Floral bracts ovate-lanceolate, acute, much shorter than the pedicels. Flowers slender, the pedicels 13 mm. long; sepals narrowly triangular, acuminate, 15–18 mm. long; petals up to 45 mm. long, red, ligulate-appendaged, exceeding the stamens; ovary almost wholly superior.

Thickets; open slopes. Huánuco: Chinchao, *Ruiz & Pavón* (type). Pampayacu, hacienda at mouth of Río Chinchao, 1,200 meters, *5114*. Río Huallaga Canyon, below Río Santo Domingo, 1,300 meters, *4266*.—Junín: Province of Tarma, on the Palca road above Huacapistana, 1,700–1,900 meters, *Weberbauer 1983*. La Merced, Hacienda Schunke, 1,300 meters, *5749; Killip & Smith 24610*. Colonia Perené, 680 meters, *Killip & Smith 25074*. La Merced, 700 meters, *Killip & Smith 23756*.—Cuzco: Lares Valley between Calca and Pasto Grande, *Weberbauer 7930*.—Indefinite: *Mathews 3132*. Bolivia.

12. **Pitcairnia pulverulenta** R. & P. Fl. 3: 36. *pl. 259*. 1802.

Plant large, probably over 1 meter high. Leaves subdimorphic, the outer ones distinctly petiolate, the inner merely narrowed between sheath and blade; sheath ovate, entire; blade linear-lanceolate, 25–30 mm. wide, plicate, densely serrulate throughout. Scape erect, stout, pulverulent, its bracts imbricate, ovate, acute, serrulate; inflorescence amply paniculate; primary bracts like the upper scape bracts, much shorter than the axillary branches. Racemes spreading, lax. Floral bracts ovate, acuminate, much shorter than the pedicels. Flowers spreading, the pedicels slender, 1 cm. long; sepals lance-ovate, acute, 6 mm. long; petals narrow, acute, 4 cm. long, bearing a truncate scale at the base, red; stamens and pistil about equaling the petals; ovary two-thirds superior.

Woods. Junín: Vitoc, *Ruiz & Pavón*. Endemic.

13. **Pitcairnia subpetiolata** Baker, Journ. Bot. 19: 267. 1881. *P. sessiliflora* Rusby, Bull. N. Y. Bot. Gard. 4: 457. 1907.

Leaves dimorphic, some reduced to serrate spines, others foliaceous, narrowed above the sheath but not definitely petiolate, linear, acuminate, entire except at the base, the blade 6–9 dm. long, 15 mm. wide, glabrous above, densely whitish-lepidote below. Scape erect,

its bracts triangular, acuminate, much shorter than the internodes. Inflorescence laxly racemose, scantly furfuraceous to glabrous. Floral bracts broadly elliptic, apiculate, shorter than the pedicels. Flowers erect or nearly so, the pedicels stout, straight; sepals 20–22 mm. long, ecarinate, sublinear, emarginate, sparingly lepidote; petals red, exceeding the stamens, bearing a large, strongly bidentate scale at the base; ovary more than half superior.

San Martín: Near Tarapoto, *Spruce* (type). In dry, red, sandy loam, cliff, Lamas, 840 meters, *Williams 6377*.—Huánuco: Grassy, brushy slopes, Posuso, 600 meters, *4624*. Bolivia.

14. **Pitcairnia inermis** Meyer ex Schult. f. in R. & S. Syst. Veg. 7: 1238. 1830. *Pourretia inermis* Meyer in Presl, Rel. Haenk. 1: 123. *pl. 23*. 1827. *Orthopetalum inerme* Beer, Brom. 72. 1857.

Acaulescent, up to 5 dm. high. Leaves all alike, deciduous, not at all contracted above the broadly ovate, dark sheath; blade entire, linear, acuminate, 4–9 dm. long, 7–12 mm. broad, white-lepidote below. Scape stout, soon glabrous, its bracts ovate-lanceolate, entire, filiform-caudate, much exceeding the internodes. Inflorescence thyrsoid; axis stout, soon glabrous; branches abbreviated. Primary bracts almost or quite equaling the axillary branches. Floral bracts thin, scale-like, shorter than the pedicels. Flowers 30–35 mm. long, the pedicels slender, about 7 mm. long; sepals obtuse, ecarinate, 11–15 mm. long; petals scarlet, rapidly fading to white, ligulate-appendaged, exceeding the stamens; ovary more than three-fourths superior.

Steep, rocky grasslands. Huánuco: Near Casapí, *Poeppig 1385*. Chinchao Valley, *Weberbauer 6804*. Huacachi, near Muña, 2,200 meters, *4077*.—Indefinite: *Haenke* (type); *Mathews 2088*. Bolivia.

15. **Pitcairnia tarapotensis** Baker, Brom. 102. 1889.

Stemless, 5–14 dm. high. Leaves dimorphic, all persistent, some reduced to dark, spinulose-serrate spines, others foliaceous, narrowed above the sheath but not definitely petiolate, spinose only at the base, glabrous, linear-lanceolate, 4–10 dm. long, 15 mm. wide. Scape slender, erect, furfuraceous at first, becoming glabrous, its bracts narrowly triangular, acuminate, entire, glabrous, the upper ones shorter than the internodes. Inflorescence laxly bipinnate; axis glabrous. Floral bracts narrowly elliptic, apiculate, much shorter than the pedicels, glabrous. Flowers suberect to spreading, glabrous, 4 cm. long, the pedicels slender, 12 mm. long; sepals oblong,

broadly acute or obtuse and apiculate, 12 mm. long, ecarinate; petals red, naked or with 2 minute, oblique calli, narrow, acute; ovary three-fourths superior.

Grassy mountain top, mountain forest. San Martín: Near Tarapoto, *Spruce* (type). Zepelacio, near Moyobamba, 1,200–1,600 meters, *Klug 3281*. Endemic.

16. **Pitcairnia truncata** L. B. Smith, Contr. Gray Herb. 98: 10. *pl. 3, f. 8–9*. 1932.

Slightly less than 1 meter high. Leaves fasciculate, dimorphic, some reduced to dark brown, serrate spines, others foliaceous, somewhat narrowed above the sheath but not at all petiolate, the blades linear-lanceolate, acuminate, 4–5 dm. long, 2 cm. wide, remotely and minutely spinulose-serrate, glabrous above, densely minute-puberulent below. Scape erect, sparingly furfuraceous-lepidote, its bracts narrowly triangular, filiform-caudate, submembranaceous, entire. Inflorescence laxly paniculate, pyramidal, white-furfuraceous; branches spreading, straight, up to 7 cm. long (not fully developed), the sterile base very short. Floral bracts elliptic, apiculate, shorter than the pedicels and enfolding their bases. Flowers slender, about 4 cm. long, mostly spreading, the pedicels slender, 6 mm. long; sepals oblong, truncate, 1 cm. long, carinate, slightly asymmetric; petals bright red, ligulate-appendaged, about equaling the stamens; style exserted, the ovary more than half superior.

Wooded hillsides. Ayacucho: Carrapa, between Huanta and Río Apurímac, 1,500 meters, *Killip & Smith 22414*. Endemic.

17. **Pitcairnia brevicalycina** Mez, Repert. Sp. Nov. 16: 9. 1919.

Leaves persistent, narrowed above the sheath but not petiolate, lanceolate, 13 dm. long, 4 cm. wide, entire, soon glabrous. Scape more than a meter high, stout, strict, its bracts triangular, shorter than the internodes. Inflorescence simple, densely racemose, 4 dm. long; axis stout, angled. Floral bracts ligulate, shorter than the pedicels. Flowers erect, 42 mm. long, glabrous, greenish yellow, the pedicels slender, 8 mm. long; sepals 1 cm. long, oblong, obtuse, ecarinate; petals naked, obtuse, exceeding the stamens.

Huánuco: Province of Huánuco, valley of Chinchao, *Weberbauer 6825a*. Venezuela.

18. **Pitcairnia straminea** Poeppig ex Mez in DC. Monogr. 9: 427. 1896.

Imperfectly known, probably 1 meter high. Leaves narrowed above the sheath but not definitely petiolate, linear-lanceolate, filiform-acuminate, 7 dm. long, 20 mm. wide, entire, densely white-lepidote below. Scape stout, scantly furfuraceous, its bracts remote, ovate-apiculate, 18 mm. long. Inflorescence laxly racemose, interrupted at the base, 45 cm. long; axis stout, straight. Floral bracts ovate-elliptic, obtuse, exceeding the pedicels. Flowers erect, the pedicels 5 mm. long; sepals narrowly triangular, 15 mm. long, obtuse-mucronulate; petals naked.

Huánuco: Near Cochero, *Poeppig 1442*. Endemic.

19. **Pitcairnia viridis** Mez, Repert. Sp. Nov. 16: 8. 1919.

Giving off low shoots from a short, erect rhizome, densely cespitose, slender, up to 33 cm. high. Leaves all alike, squarrose, rosulate, persistent, green above, densely appressed-white-lepidote below, 12 cm. long, 8 mm. wide, acuminate, spinulose-serrate. Scape slender, erect, glabrous, its bracts entire, pale, all but the lowest remote. Inflorescence up to 5-flowered, racemose; axis glabrous. Floral bracts broadly ovate, acute, entire, brown, membranaceous, glabrous, longer than the pedicels and secund with them. Flowers spreading, secund, 27 mm. long, the pedicels stout, 5 mm. long, densely brown-tomentose; sepals obtuse, 12 mm. long, densely brown-lepidote; petals green, naked, obtuse; stamens included; ovary more than three-fourths superior.

Indefinite: *Weberbauer*. Endemic.

20. **Pitcairnia sceptriformis** Mez, Bull. Herb. Boiss. II. 4: 628. 1904.

Caulescent. Leaves not deciduous, glabrous; sheath not known; petiole 15 cm. long, grooved, spinose-serrate; blade entire, acuminate, 6 dm. long, 7 cm. broad. Scape evident, its bracts thin and membranaceous, not leaf-like. Inflorescence racemose, elongate, densely cylindric, 4 dm. long, 35 mm. in diameter, glabrous; axis stout. Bracts ovate, acute, membranaceous, 2 cm. long, exceeded by the sepals. Flowers erect, 43–48 mm. long, the pedicels 3–8 mm. long; sepals rigid, coriaceous, subtriangular, acuminate, recurving-mucronate at the apex, 24–30 mm. long; petals red, scaleless but with two vertical calli each, lingulate, mucronate, exceeding the stamens and pistil; ovary pyramidal, superior. Seeds caudate.

Scandent on trees. Loreto: Cerro de Ponasa, 1,300 meters, *Ule 62p.* Endemic.

21. **Pitcairnia grandiflora** Mez, Repert. Nov. Sp. 3: 5. 1906.

Stems decumbent, branching, 8–9 cm. thick. Leaves 7–8 dm. long, the blade narrowly triangular, acuminate, 36 mm. wide, densely cinereous-lepidote on both sides, serrate with spines 1 cm. long. Inflorescence simple, densely racemose, cylindric, 3 dm. long, 55 mm. in diameter, glabrous at anthesis; axis stout. Floral bracts lanceolate, about 45 mm. long and 12 mm. wide, slightly shorter than the sepals, thick, coriaceous, entire, reflexed or revolute. Flowers 7 cm. long, erect or nearly so, the pedicels thick, 15 mm. long; sepals narrowly triangular, acuminate, 35 mm. long, coriaceous or fleshy; petals oblong, obtuse, reddish brown, naked.

Amazonas: Province of Chachapoyas, eastern slopes of the valley of the Río Marañón above Balsas, 1,100–1,200 meters, *Weberbauer 4268.* Bolivia.

22. **Pitcairnia scandens** Ule, Verh. Bot. Ver. Brandenb. 48: 140. 1907. *P. riparia* Mez, Repert. Sp. Nov. 12: 416. 1913.

Rhizome elongate, giving off stolons, covered with persistent leaf bases. Leaves dimorphic, some persistent, reduced to dark, spinulose-serrate spines, others deciduous, narrowed above the sheath but not petiolate, entire except for the persistent base, glabrous, linear-lanceolate, acuminate, 40–45 cm. long, 10–24 mm. wide. Scape slender, erect, its bracts shorter than or about equaling the internodes, ovate-elliptic, apiculate. Inflorescence laxly racemose. Floral bracts ovate-lanceolate, acuminate, much exceeding the pedicels, entire. Flowers suberect, up to 7 cm. long, the pedicels 10–15 mm. long; sepals triangular, acute, 23–25 mm. long; petals naked; ovary almost wholly superior.

Scandent on trees. Loreto: Cerro de Escalera, 1,300 meters, *Ule 6687.* Cajamarca: Province of Jaén, dry banks in the valley of Río Tabaconas, *Weberbauer 6156.* Endemic.

23. **Pitcairnia Poeppigiana** Mez in Mart. Fl. Bras. 3, pt. 3: 461. 1894.

Leaves strongly petiolate, the blade spinulose-serrate, glabrous, lanceolate, 1 meter long, 85 mm. wide. Inflorescence simple, densely spicate, strobiliform, many-flowered. Floral bracts elliptic, rounded-mucronulate, 28 mm. long, 12 mm. wide, membranaceous, glabrous.

Flowers sessile, 7 cm. long; sepals oblong, abruptly acute, mucronate, 25 mm. long, 6 mm. wide; petals naked, obtuse; ovary half superior.

Swamps in virgin forest. Loreto: Province of Mainas, near Yurimaguas, *Poeppig 2424*. Endemic.

24. **Pitcairnia puyoides** L. B. Smith, Field Mus. Bot. 11: 147. 1936.

Plant stout and like a *Puya* in habit, probably well over 1 meter high. Leaves 9 dm. long; sheath broadly ovate, 7 cm. long, dark castaneous, lustrous, glabrous above, sparsely sordid-flocculose below; blade linear-lanceolate, acuminate, 33 mm. wide, slightly contracted at the base but not petiolate, densely serrate, the spines straight, 3 mm. long, soon glabrous. Scape erect, 15 mm. in diameter, subglabrous, its bracts suberect, foliaceous, densely imbricate. Inflorescence laxly compound, flocculose, soon glabrous; racemes laxly flowered, 15–21 cm. long; rachis stout. Floral bracts ovate, acuminate, about half as long as the pedicels. Flowers suberect or divergent; pedicels slender, 15–20 mm. long; sepals asymmetrical, ovate, acute, 24 mm. long, 8 mm. wide, thick, coriaceous; petals narrow, 6 cm. long, cream-colored; stamens included; ovary two-thirds superior; ovules caudate.

Epiphytic in forest. San Martín: Zepelacio, near Moyobamba, 1,200–1,600 meters, *Klug 3547*. Endemic.

25. **Pitcairnia cuzcoensis** L. B. Smith, Contr. Gray Herb. 98: 9. *pl. 3, f. 3–5*. 1932.

About 9 dm. high. Leaves dimorphic, the outer reduced to dark brown, scale-like, pungent-mucronate sheaths, the inner green, narrowed above the sheath but not petiolate, entire except near the base, linear-lanceolate, 5–6 dm. long, 25 mm. wide, glabrous above, minutely white-puberulent below. Scape erect, slender, scantly furfuraceous, its bracts narrowly triangular, acuminate, the uppermost shorter than the internodes. Inflorescence a depauperate panicle; axis scantly pale-furfuraceous. Floral bracts elliptic-lanceolate, acute or acuminate, about equaling the pedicels. Flowers suberect to spreading, 4 cm. long, slender, the pedicels slender, 1 cm. long; sepals narrowly triangular, acuminate, scantly punctulate-lepidote; petals scarlet-red, naked; stamens exserted; ovary three-fourths superior.

Mixed grass and shrub formation. Cuzco: Province of Quispicanchi, Chaupichaca, Marcapata Valley, 1,700 meters, *Weberbauer 7825*. Endemic.

26. **Pitcairnia Ruiziana** Mez in DC. Monogr. 9: 420. 1896.

Up to 5 dm. high. Only the inner leaves known, these not at all contracted above the narrow sheath, sublinear, acuminate, entire, with a membrane of subferruginous scales below, 3 dm. long, 8 mm. wide. Scape erect, glabrous, its bracts leaf-like below, ovate-triangular above, exceeding the internodes, glabrous. Inflorescence a few-branched panicle, glabrous throughout, lax, narrowly thyrsoid, its branches 2 cm. long (without the flowers), suberect, 3–6-flowered. Floral bracts lanceolate, acute, 5 mm. long, hyaline, shorter than the pedicels. Flowers 42 mm. long, the pedicels slender; sepals narrowly subtriangular, 2 cm. long, obtuse-mucronulate; petals naked, white or yellowish when dry, exceeding the stamens, narrow, acute; ovary more than three-fourths superior.

Indefinite: *Ruiz & Pavón*. Endemic.

27. **Pitcairnia ferruginea** R. & P. Fl. 3: 36. 1802. *Pourretia ferruginea* Spreng. Syst. Veg. 2: 23. 1825. *Pitcairnia asterotricha* Poepp. & Endl. Nov. Gen. 2: 42. *pl. 158*. 1838. *Puya grandiflora* Hook. Bot. Mag. 87: *pl. 5234*. 1861. *Pitcairnia consimilis* Baker, Journ. Bot. 19: 266. 1881. *Puya echinotricha* André, Rev. Hort. 60: 565. 1888. *Pitcairnia echinotricha* Baker, Brom. 119. 1889. *P. Weberbaueri* Mez, Bull. Herb. Boiss. II. 4: 627. 1904. *P. cotahuasiana* Harms, Notizbl. Bot. Gart. Berlin 10: 788. 1929. *P. Herrerae* Harms, op. cit. 789. 1929. *P. imperialis* Harms, op. cit. 790. 1929. *P. latibracteata* Harms, op. cit. 788. 1929. *P. laresiana* Harms, Notizbl. Bot. Gart. Berlin. 11: 58. 1930.

A very variable species. Up to several meters high; stem stout, woody, covered with the remains of dead leaves. Leaves all alike, densely rosulate, up to 1 meter long and 5 cm. wide, narrowly triangular, acuminate, pungent, coarsely spinose-serrate, white-lepidote below. Scape stout, rather woody, ferruginous-furfuraceous, then glabrous, its bracts ovate, acuminate, serrate. Inflorescence usually paniculate, pyramidal, covered with ferruginous stellate scales; branches secundly many-flowered. Floral bracts ovate, acute, usually shorter than the pedicels. Flowers up to 14 cm. long though often much smaller, long-pedicellate; sepals oblong, obtuse, densely stellate-ferruginous-lepidote; petals greenish white to various shades of purple, usually with 2 vertical calli near the base but varying to completely naked in a single flower; ovary two-thirds superior.

Open or shrubby, rocky hillsides. Amazonas: Near Chachapoyas, *Mathews*.—Huánuco: Near Casapí, Cochero, *Poeppig 1531*. Yanahuanca, ca. 3,300 meters, *1160*. Ambo, 2,300 meters, *3148*.

Mountains near Huánuco, *Haenke.*—Lima: Near Lima, *Ruiz & Pavón; Cuming 976; Wilkes Expedition.* Río Blanco, 3,000–3,500 meters, *711; Killip & Smith 21660.*—Junín: Tarma, 3,000–3,200 meters, *Killip & Smith 21806.* Huacapistana, 1,800–2,400 meters, *Killip & Smith 24209.* Province of Tarma, above Huacapistana on the Palca road, 1,700–1,900 meters, *Weberbauer 1989.*—Cuzco: Province of Quispicanchi, Paucartambo Valley, Hacienda Capana, 3,450 meters, *Herrera 1075.* Province of Calca, Lares Valley above Mantoc, 2,500 meters, *Weberbauer 7915.* Urubamba Valley near Yucai, 3,000 meters, *Herrera 1463.* Province of Cuzco, Sacsahuamán, 3,500–3,600 meters, *Herrera 857, 1196, 2180, 3085.* Vicinity of Cuzco, 3,300–3,500 meters, *Herrera 61, 125, 164, 426.* Province of Cuzco, Valle de Oropeza, Sailla, 3,200 meters, *Herrera 1760.* Sicuani, 3,550 meters, *Hicken 9.*—Arequipa: Province of La Unión, above Alca in the valley of Cotahuasi, 3,000–3,100 meters, *Weberbauer 6880.*—Puno: Near Sandía, 2,100 meters, *Weberbauer 570.*—Indefinite: *Gay 1921.* Ecuador, Bolivia. "Achupalla," "orcco-achupalla," "ccoe-achupalla," "china-achupalla."

EXCLUDED SPECIES

Pitcairnia odontopoda Baker was formerly attributed to Peru, but is now proved to have been collected in Bolivia.

5. TILLANDSIA L.

Caulescent or acaulescent herbs of very variable habit. Leaves rosulate or fasciculate or distributed along a stem, polystichous or distichous, entire, ligulate or subtriangular. Scape usually distinct. Inflorescence various, usually of distichous spikes or sometimes reduced to a single polystichous spike by the reduction of the spikes to single flowers or rarely the whole inflorescence reduced to a single flower. Flowers perfect. Sepals usually symmetric, free, or equally or posteriorly joined. Petals free, naked or rarely with vertical folds. Stamens of various lengths relative to the petals and to the pistil. Ovary superior, glabrous. Ovules usually many and caudate. Capsule septicidal. Seeds erect, narrowly cylindric or fusiform; coma white, straight, basal.—Dedicated to Elias Tillands, 1640–1693, Swedish botanist. Over 350 species. Tropical and subtropical America, from the southeastern United States, Mexico, Central America, and the Antilles, to northern Argentina and Chile. Type species, *Tillandsia utriculata* L.

Spikes with flowers distichous or secund, or else the inflorescence reduced to a single flower.

Sepals asymmetric, free, oblong or broadest near the apex, not over 10 mm. long.

Inflorescence simple or few-branched, floral bracts membranaceous, nearly twice as long as the sepals.

Leaves straight.....1. *T. Seemanni.*

Leaves undulate-crisped.....2. *T. crispa.*

Inflorescence amply paniculate or the floral bracts shorter than the sepals.

Floral bracts equaling or longer than the sepals.

Floral bracts even or faintly few-nerved near the margin.
3. *T. triticea.*

Floral bracts closely and prominently nerved.
4. *T. pendulispica.*

Most of the floral bracts distinctly shorter than the sepals.

Branches of the inflorescence divided.

Floral bracts and sepals glabrous or sparingly pale-lepidote.

Scape bracts nearly or quite equaling the internodes.

Flowers more than twice as long as the internodes; floral bracts sharply carinate..5. *T. multiflora.*

Flowers remote; floral bracts scarcely carinate.

Leaf blade 3 cm. broad....6. *T. pallidoflavens.*

Leaf blade not over 5 mm. broad.
7. *T. Weberbaueri.*

Scape bracts small, the upper ones less than half as long as the internodes.....8. *T. commixa.*

Floral bracts and sepals densely ferruginous-lepidote.
9. *T. Bakeri.*

Branches of the inflorescence simple.

Leaf blade not over 2 cm. broad at the base; sepals 3–5 mm. long.

Leaf blade linear; scape bracts small, remote.
10. *T. parviflora.*

Leaf blade narrowly triangular; scape bracts usually imbricate.....11. *T. adpressa.*

Leaf blade over 2 cm. broad; sepals up to 9 mm. long.
12. *T. tetrantha.*

Sepals symmetric, broadest near the base, often more than 10 mm. long.

Inflorescence of a single terminal or pseudo-axillary spike or reduced to a single flower.

Leaves distichous.

Stem rarely over 2 dm. long, wholly concealed by the imbricate leaf sheaths.

Leaf blade well over 2 mm. thick, acuminate. 13. *T. Gilliesii.*

Leaf blade not over 2 mm. thick, obtuse.

Sepals free or equally short-connate; inflorescence always terminal.

Scape bracts 2 or 3 immediately below the first floral bract; stem up to 2 dm. long; sepals lepidote..... 14. *T. Landbeckii.*

Scape bract only one immediately below the first floral bract; stem not over 1 dm. long; sepals usually glabrous..... 15. *T. recurvata.*

Sepals connate posteriorly; inflorescence often becoming pseudo-axillary..... 16. *T. capillaris.*

Stem several meters long, exposed between alternating bunches of leaves; inflorescence 1-flowered, pseudo-axillary..... 17. *T. usneoides.*

Leaves polystichous.

Spike lax with the floral bracts less than twice as long as the internodes, or reduced to a single flower.

Flowers strict or spike 1-flowered.

Leaves not more than 15 mm. long, strict; spike always 1-flowered..... 18. *T. bryoides.*

Leaves 2–4 cm. long; spike usually several-flowered. 19. *T. loliacea.*

Flowers divergent or spreading.

Plant caulescent; petals blue..... 20. *T. caerulea.*

Plant stemless; petals yellow..... 21. *T. aurea.*

Spike dense with the floral bracts at least twice as long as the internodes.

Plant caulescent; leaves distributed along the stem.

Leaf blades flat, less than 3 times as long as the barely distinct sheaths.

Inflorescence scapose; petals blue or violet. 22. *T. cauligera.*

Inflorescence sessile; petals rose. 23. *T. Macbrideana.*

Leaf blades mostly involute-subulate, many times longer than the sheaths.

Floral bracts not over 2 cm. long.

Floral bracts carinate.....43. *T. latifolia.*

Floral bracts ecarinate.

Leaves pungent, strict, appressed- or sub-pruinose-lepidote.....24. *T. caulescens.*

Leaves with soft filiform apices, tomentose-lepidote.

Plant long-caulescent; leaves shorter than the stem.....25. *T. paleacea.*

Plant short-caulescent; leaves much longer than the stem.....26. *T. streptocarpa.*

Floral bracts 4 cm. long .....27. *T. Werdermannii.*

Plant stemless; leaves rosulate or fasciculate.

Sepals rarely over 25 mm. long.

Leaf blades narrowly triangular or linear, long-acuminate.

Floral bracts much exceeding the sepals.

Floral bracts narrowly lanceolate..28. *T. patula.*

Floral bracts suborbicular...29. *T. juruana.*

Floral bracts equaling or shorter than the sepals.

Leaves strict; floral bracts equaling the sepals; petal blades narrow.....30. *T. floribunda.*

Leaves recurving; floral bracts shorter than the sepals; petal blades suborbicular. 26. *T. streptocarpa.*

Leaf blades ligulate, abruptly acute or obtuse and apiculate.

Inflorescences several from a single rosette; floral bracts 15 mm. long.....31. *T. complanata.*

Inflorescence single, terminal; floral bracts 35–45 mm. long. (Fruiting specimens of *Vriesia chrysostachys* or of *V. heliconioides* may be sought here.)

Sepals 35–40 mm. long.

Floral bracts obtuse, inflated, ecarinate. 32. *T. Walteri.*

Floral bracts acute, sharply carinate. 33. *T. Lindeni.*

Inflorescence compound.

Sheaths of the primary bracts shorter than the axillary branches.

Floral bracts about half as long as the sepals; spikes lax.

Rachis deeply excavated, winged. . . . 34. *T. platyrhachis.*

Rachis not excavated nor winged.

Flowers strict; spikes many-flowered, elongate. 35. *T. extensa.*

Flowers divergent; spikes few-flowered, short.

Petals purple. . . . . 36. *T. humilis.*

Petals yellow with brown spots. 37. *T. aureobrunnea.*

Floral bracts equaling or exceeding the sepals or else the spikes dense.

Inflorescence digitate.

Leaf blades obtuse and apiculate, broadly ligulate. 38. *T. brevilingua.*

Leaf blades acuminate, narrowly triangular or linear.

Leaves tomentose-lepidote.

Floral bracts sharply carinate, equaling the sepals; stem elongate. . . . . 39. *T. tectorum.*

Floral bracts ecarinate, shorter than the sepals; stem short. . . . . 26. *T. streptocarpa.*

Leaves appressed-lepidote.

Scape short or none. . . . . 40. *T. heteromorpha.*

Scape elongate.

Leaf sheaths suborbicular, inflated. 41. *T. disticha.*

Leaf sheaths narrowly triangular to elliptic, flat.

Leaf blades setaceous, strict.

Floral bracts lepidote; stamens exserted. 42. *T. juncea.*

Floral bracts glabrous; stamens included. 30. *T. floribunda.*

Leaf blades broader.

Floral bracts not carinate. 22. *T. cauligera.*

Floral bracts carinate.

Floral bracts densely lepidote; leaves narrowly triangular. . 43. *T. latifolia.*

Floral bracts glabrous; leaves linear. 44. *T. subandina.*

Inflorescence pinnately divided.

Floral bracts remote, strict. . . . . 45. *T. adpressiflora.*

Floral bracts either imbricate or divergent.

Branches of the inflorescence divided; inflorescence laxly pyramidal.

Spikes not more than 15 mm. broad.

Floral bracts carinate; spikes not over 11 cm. long, straight.

Sepals lanceolate, acute. . . . . 46. *T. maculata.*

Sepals oblong, obtuse. . . . . 47. *T. Arnoldiana.*

Floral bracts ecarinate; spikes up to 22 cm. long, often curved. . . . . 48. *T. platyphylla.*

Spikes up to 5 cm. broad. . . . . 49. *T. rubra.*

Branches of the inflorescence simple or else the inflorescence densely cylindric.

Floral bracts lepidote.

Leaf sheath suborbicular, sharply distinct from the blade. . . . . 50. *T. Ulei.*

Leaf sheath narrower, scarcely distinct from the blade.

Sepals strongly carinate; petals naked. 43. *T. latifolia.*

Sepals ecarinate; petals bearing vertical calli. 51. *T. Harmsiana.*

Floral bracts glabrous.

Inflorescence pendulous, of 3–4 linear spikes. 52. *T. cereicola.*

Inflorescence erect.

Floral bracts prominently nerved throughout.

Primary bracts lanceolate or elliptic, not caudate.

Flowers divergent to spreading; bracts thin.

Primary bracts purple, densely lepidote.....53. *T. purpurea.*

Primary bracts stramineous, glabrous. 54. *T. straminea.*

Flowers strict; bracts coriaceous.

Stemless; petal blades narrow. 55. *T. Gayi.*

Caulescent; petal blades suborbicular. 26. *T. streptocarpa.*

Primary bracts broadly ovate, the lower ones caudate.....56. *T. oroyensis.*

Floral bracts even or faintly nerved near apex.

Leaves with dark cross bands. 56. *T. Roezli.*

Leaves concolorous.

Spikes perfectly linear, the rachis not at all concealed by the floral bracts. (Imperfect specimens of *Vriesia albiflora* Ule may be sought here.)

Spikes lanceolate or linear-lanceolate, the rachis almost wholly concealed by the floral bracts...49. *T. rubra.*

Sheaths of the primary bracts exceeding at least the lower axillary branches.

Inflorescence elongate, interrupted toward base.

Branches of the inflorescence divided; floral bracts carinate.....58. *T. pinnato-digitata.*

Branches of the inflorescence simple.

Leaf blades narrowly triangular, acuminate. 59. *T. interrupta.*

Leaf blades ligulate, acute.

Spikes densely 4-flowered; floral bracts barely carinate near the apex..... 60. *T. ionochroma.*

Spikes laxly 1–3-flowered; floral bracts strongly carinate..... 64. *T. biflora.*

Inflorescence compact, not interrupted.

Floral bracts equaling or exceeding the sepals.

Rachis elongate, more than half the total length of the spike.

Floral bracts lepidote, nerved..... 43. *T. latifolia.*

Floral bracts glabrous, even.... 61. *T. Schimperiana.*

Rachis abbreviated, much less than half the length of the few-flowered spike.... 62. *T. sphaerocephala.*

Floral bracts shorter than the sepals.

Plant caulescent..... 63. *T. calocephala.*

Plant acaulescent.

Leaf blades linear, not over 2 cm. wide.

Floral bracts much shorter than the sepals, not at all imbricate..... 64. *T. biflora.*

Floral bracts but slightly shorter than the sepals, imbricate..... 65. *T. fusco-guttata.*

Leaf blades lance-triangular, 45 mm. wide. 66. *T. Wangerini.*

Spikes single with flowers many-ranked.

Leaf blades ligulate, often dark-spotted..... 64. *T. biflora.*

Leaf blades narrowly triangular or subulate.

Floral bracts coriaceous; stamens exserted..... 42. *T. juncea.*

Floral bracts thin; stamens included.

Sepals lanceolate, membranaceous, connate posteriorly.

Scape evident..... 67. *T. pulchella.*

Scape none..... 68. *T. nana.*

Sepals suborbicular, coriaceous, free..... 69. *T. latisepala.*

1. **Tillandsia Seemanni** (Baker) Mez in DC. Monogr. 9: 737. 1896. *Guzmania Bulliana* Baker, Journ. Bot. 25: 173. 1887, not André, 1886. *Caraguata pulchella* André, Rev. Hort. 60: 565. 1888,

not *Tillandsia pulchella* Hook. 1825. *G. Seemanni* Baker, Brom. 153. 1889. *T. Mezii* André ex Mez in DC. Monogr. 9: 738. 1896.

Caulescent or acaulescent, 2 dm. high. Leaves 10–15 cm. long, thin; sheath broadly ovate, dark brown; blade not over 8 mm. broad, narrowly triangular. Scape slender, erect; scape bracts 3 or 4, suborbicular, clasping the scape, pale-lepidote, shorter than the internodes. Inflorescence erect, straight or slightly curved, simple or sometimes of 2 spikes, dense, few-flowered; rachis ferruginous-tomentose; floral bracts imbricate, 14 mm. long, exceeding the flowers, suborbicular, broadly subacute or apiculate, membranaceous, strongly nerved, appressed-pale-lepidote. Flowers erect, subsessile, 12–15 mm. long; sepals 9.5 mm. long, distinctly asymmetrical by a large wing, obtuse, submembranaceous, few-nerved, appressed-lepidote; petals obtuse, much longer than the stamens; ovary subglobose.

Cuzco: *C. Bues in herb.*; *Herrera 2152.* Ecuador.

2. **Tillandsia crispa** (Baker) Mez in DC. Monogr. 9: 739. 1896. *Guzmania crispa* Baker, Journ. Bot. 25: 173. 1887. *T. undulifolia* Mez in DC. Monogr. 9: 740. 1896. *T. plicatifolia* Ule, Verh. Bot. Ver. Brandenb. 48: 144. 1907.

Acaulescent, 1–3 dm. high. Leaves many, densely rosulate, finely appressed-lepidote throughout; sheath large, brown-lepidote; blade very narrowly triangular, undulate-crisped. Scape erect or slightly curved, slender; scape bracts elliptic, subinflated, apiculate to finely caudate, appressed-lepidote. Inflorescence of one or of several digitate spikes. Spikes oblong, densely 6–36-flowered, 3–8 cm. long, 15–25 mm. wide; rachis brown-lepidote; floral bracts 9–15 mm. long, much exceeding the sepals, suborbicular, inflated, lepidote. Flowers sessile; sepals 5–8 mm. long, broadly elliptic, asymmetric, ecarinate, coriaceous, sparingly lepidote or glabrous, even; petals exceeding the sepals; stamens and pistil included.

Epiphytic. Loreto: Cerro de Escalera, 1,400 meters, *Ule 6665.* Panama, Colombia, Ecuador.

3. **Tillandsia triticea** Burch. ex Baker, Journ. Bot. 26: 42. 1888. *T. Parkeri* Baker, Journ. Bot. 26: 42. 1888. *T. viridis* Baker, Brom. 204. 1889. *Vriesia viridis* Morr. ex. Baker, Brom 204. 1889. *V. Luschnathii* Mez in Mart. Fl. Bras. 3, pt. 3: 555. *pl. 103.* 1894.

Acaulescent, 4–7 dm. high. Leaves rosulate, 2–3 dm. long, densely punctulate-lepidote throughout; sheath broadly ovate-elliptic, brown; blade ligulate, 30–35 mm. broad, obtuse, apiculate,

usually with irregular, dark purple mottling. Scape erect, glabrous; scape bracts imbricate, narrowly ovate, apiculate, dense'y punctulate-lepidote. Inflorescence laxly compound with simple branches, distichous, 2–3 dm. long, glabrous; primary bracts like the scape bracts, much shorter than the spikes. Spikes 8.5–15 cm. long, linear, flexuous, spreading, 1 cm. broad, often long-stipitate with several sterile bracts at the base, 14–36-flowered; floral bracts broadly ovate, acute, 7 mm. long, equaling the sepals, ecarinate, glabrous, coriaceous, even or faintly nerved; rachis angled, flexuous. Flowers suberect to spreading, normally 3–4 mm. apart, sessile; sepals obovate, glabrous, coriaceous, even; petals yellowish; stamens included; ovary broadly ellipsoid; style short. Capsule 23 mm. long, slenderly cylindric.

Epiphytic. Junín: Dense forest, Pichis Trail, San Nicolás, 1,100 meters, *Killip & Smith 26055*. Trinidad, British Guiana, Brazil, Bolivia.

4. **Tillandsia pendulispica** Mez in DC. Monogr. 9: 745. 1896. *T. scorpiura* Mez, Bull. Herb. Boiss. II. 5: 104. 1905. *T. triangularis* Rusby, Descr. So. Amer. Pl. 3. 1920.

Acaulescent, 5 dm. high. Leaves 3 dm. long, densely rosulate, coriaceous, densely and finely appressed-lepidote, often dark purple-spotted; sheaths very large, ovate, forming an ellipsoid pseudobulb, brown-lepidote; blade 8–12 mm. wide, linear or narrowly triangular, acuminate. Scape slender, erect, glabrous; scape bracts lanceolate, acute, strict, remote. Inflorescence compound with the lower branches sometimes divided, composed of 16 spikes; axis scantly tomentose-lepidote, becoming glabrous; primary bracts like the scape bracts but obtuse, strict, usually much shorter than the stipe of the axillary spike. Spikes subdensely 10–20-flowered, oblong, 5 cm. long, 1 cm. wide with the rachis strongly geniculate or longer and narrower when the rachis is more nearly straight, subequal, the lower ones long-stipitate and deflexed; rachis tomentose-lepidote, becoming glabrous; floral bracts imbricate, ovate to suborbicular, 7 mm. long, ecarinate, submembranaceous, prominently nerved, soon glabrous. Flowers erect, sessile; sepals 5 mm. long, obovate, emarginate, cucullate, even, soon glabrous; petals 7 mm. long, yellow with opaque dots; stamens included; ovary broadly ellipsoid; style short. Capsule cylindric, 13–15 mm. long, short-beaked.

Epiphytic. Huánuco: Near Cochero, *Poeppig 1348*.—Junín: Hacienda Schunke, La Merced, 1,200 meters, *5784*.—Puno: Near Tambo Cotani on the road between Sandía and Chunchosmayo, 1,500 meters, *Weberbauer 1287*. Bolivia.

5. **Tillandsia multiflora** Benth. Bot. Sulph. 174. 1844. *T. decipiens* André, Rev. Hort. 60: 567. 1888.

Acaulescent, 4–8 dm. high. Leaves rosulate, 4 dm. long, densely punctulate-lepidote; sheaths scarcely distinguished from the blades; blades narrowly triangular with a long, caudate tip, 1–3 cm. wide. Scape erect, glabrous, its bracts usually imbricate, stramineous, punctulate-lepidote, at least the lower ones caudate. Inflorescence erect, tripinnate, lax, 4 dm. long, 15 cm. in diameter; primary bracts variable in size in relation to the branches, punctulate-lepidote; branches spreading; secondary bracts but little larger than the floral bracts. Spikes oblong, 3–5 cm. long, 10–13 mm. wide, spreading, rather densely 15–21-flowered; rachis geniculate, glabrous. Floral bracts ovate, acute, nerved, sharply keeled, 3–5 mm. long, scantly lepidote to glabrous. Flowers 6 mm. long, spreading; sepals oblong, asymmetric, 5 mm. long; stamens included; pistil short. Capsule cylindric, short-beaked, 15–25 mm. long.

Epiphytic. Piura: Prov. Paita, Talara, *Haught 94*. Ecuador.

6. **Tillandsia pallidoflavens** Mez, Repert. Nov. Sp. 3: 36. 1906.

Plant 1 meter or more high. Leaves about 20, densely subbulbose-rosulate, 3–4 dm. long, punctulate-lepidote; sheath large, elliptic, densely brown-lepidote; blade 3 cm. broad, linear, acuminate, light green, concolorous. Scape erect, slender, subglabrous; scape bracts imbricate, lanceolate, acuminate. Inflorescence erect, amply compound, 5 dm. long, 12 cm. in diameter; axis straight; branches ascending, 12 cm. long, the lower ones bearing 2–6 spikes; primary bracts much shorter than the axillary branches. Spikes short-stipitate, laxly 12-flowered, suberect, 4 cm. long; rachis angled, flexuous, pale-appressed-lepidote, soon glabrous; floral bracts 4 mm. long, shorter than the sepals, subreflexed, triangular, acute, densely appressed-lepidote, even, pale yellow. Flowers sessile; sepals asymmetric, obtuse, coriaceous, densely pale-lepidote; stamens included; style short.

Epiphytic. Ancash: Prov. Huari, Puccha Valley above Masín, 2,600–2,700 meters, *Weberbauer 3298*. Endemic.

7. **Tillandsia Weberbaueri** Mez, Bull. Herb. Boiss. II. 5: 104. 1905.

Acaulescent, 3–5 dm. high. Leaves densely bulbous-rosulate, 2–3 dm. long, covered throughout with hyaline, brown-centered, appressed scales; sheaths broadly elliptic; blades 5 mm. wide, linear, acuminate. Scape slender, erect, subglabrous; scape bracts nar-

rowly lanceolate, acute or acuminate, cinereous-lepidote, the upper ones slightly shorter than the internodes. Inflorescence very laxly compound with the branches divided, distichous, pyramidal, 12–23 cm. long, 8–15 cm. in diameter; primary bracts like the scape bracts, enfolding the bases of the axillary branches. Spikes oblong, 25–45 mm. long, 1 cm. wide, laxly 6–14-flowered, long-stipitate; rachis slightly geniculate; floral bracts ovate, acute, 2–3 mm. long, not keeled, even or obscurely nerved, pale-lepidote. Flowers suberect to spreading, sessile; sepals 3–4 mm. long, asymmetric, obovate, lepidote, coriaceous; petals scarcely exceeding the sepals, narrow, greenish white; stamens included; ovary subglobose; style short. Capsule slenderly cylindric, 25 mm. long.

Epiphytic. Junín: Dense forest, Schunke Hacienda, above San Ramón, 1,400–1,700 meters, *Killip & Smith 24543, 24595*. Hacienda Schunke, La Merced, 1,200 meters, *5757*.—Puno: Open woods near Chunchosmayo, prov. Sandía, 900 meters, *Weberbauer 1231*. Endemic.

8. **Tillandsia commixa** Mez, Repert. Sp. Nov. 16: 75. 1919. *T. parviflora* Auct., not R. & P. 1802. *T. parvifolia* Baker, Journ. Bot. 25: 303. 1887; error, not R. & P.

Acaulescent, 55 cm. high. Leaves ventricose-rosulate, 3 dm. long; blade 18 mm. wide, narrowly triangular, acuminate, dark-spotted, minutely appressed-lepidote. Scape slender, erect; scape bracts few, remote, lepidote, the upper obtuse. Inflorescence laxly compound with the lowest branches bearing 2 spikes, 2 dm. long, 1 dm. in diameter; axis nearly straight, subglabrous; branches 7 cm. long, the primary bracts 9 mm. long, enfolding the base of the axillary branch, obtuse. Spikes short-stipitate, laxly 18-flowered, linear, 4 cm. long, 9 mm. wide, truncate; rachis angled, undulate, lepidote; floral bracts 2 mm. long, ovate, obtuse, sparingly lepidote, even, subreflexed. Flowers spreading, not at all secund, 4 mm. long; sepals asymmetric, broadly elliptic, obtuse; petals 0.5 mm. longer than the sepals, yellow, exceeding the stamens.

Amazonas: Near Chachapoyas, 1840, *Mathews*. Endemic.

9. **Tillandsia Bakeri** L. B. Smith, Contr. Gray Herb. 95: 45. 1931. *Catopsis flexuosa* Baker, Journ. Bot. 25: 175. 1887. *T. flexuosa* Mez in DC. Monogr. 9: 744. 1896, not Swartz, 1788.

Acaulescent, 11 dm. high. Leaves rosulate, erect, 3 dm. long, punctulate-lepidote, thin; sheath narrowly ovate, dark brown; blade narrowly triangular, caudate-acuminate, light gray-green, pale-lepidote. Scape slender, soon glabrous; scape bracts lanceolate,

acuminate, submembranaceous, densely punctulate-lepidote, the upper ones shorter than the internodes. Inflorescence erect or pendulous, compound, narrow, 4 dm. long, 14 cm. in diameter, lax; axes slightly flexuous, slender; lower branches with a long stipe which equals or exceeds the primary bract, composed of 2–3 spikes; secondary bracts not extending beyond the second lowest flower. Spikes laxly 8–14-flowered, oblong, 4–5 cm. long, spreading or ascending; rachis terete, densely ferruginous-lepidote; floral bracts shorter than the mature sepals, ovate, acute, nerved, ferruginous-lepidote. Flowers suberect to spreading, sessile; sepals 4–5 mm. long, asymmetric, elliptic, broadly obtuse, keeled, ferruginous-lepidote; petals 6 mm. long, yellow with opaque spots, the limb narrow, acute, spreading; stamens included; ovary subglobose; style short. Capsule cylindric, acute, short-beaked, 18 mm. long.

Epiphytic. Huánuco: Llata, along the Río Marañón, 2,300 meters, *2278*. Bolivia.

10. **Tillandsia parviflora** R. & P. Fl. 3: 41. *pl. 269*. 1802. *Platystachys parviflora* Beer, Brom. 88. 1857. (?)*Pogospermum parviflorum* Brongn. Ann. Sci. Nat. V. 1: 329. 1864. *T. exigua* Ule, Verh. Bot. Ver. Brandenb. 48: 145. 1907.

Acaulescent, less than 3 dm. high. Leaves subbulbous-rosulate, 15 cm. long, densely and finely pale-lepidote; sheath broadly ovate to suborbicular; blade linear. Scape slender, flexuous, erect or ascending, pale-lepidote; scape bracts small, narrowly lanceolate, acuminate, pale-lepidote, remote. Inflorescence lax, erect or pendulous, of 2–7 spikes, pale-lepidote; axis slender, flexuous; primary bracts lanceolate, acute or acuminate, not reaching farther than the lowest flower of the spike. Spikes linear, laxly 6–20-flowered, usually long-stipitate, spreading, flexuous; rachis slender, angled, geniculate to nearly straight; floral bracts ovate, acute, about half as long as the sepals, nerved, obscurely keeled. Flowers suberect to spreading, sessile; sepals 3–4 mm. long, asymmetric; petals slightly exceeding the sepals, obtuse, yellow; stamens included; ovary globose; style 1 mm. long. Capsule cylindric, apiculate.

Saxicolous and epiphytic. Loreto: Cerro de Escalera, 1,200 meters, *Ule 6602*.—Huánuco: Río Huallaga Canyon below Río Santo Domingo, 1,300 meters, *4216*. Near Muña, and Huánuco, *Ruiz & Pavón*. Bolivia.

11. **Tillandsia adpressa** André, Rev. Hort. 60: 566. 1888. *Catopsis Schumanniana* Wittm. Bot. Jahrb. 11: 70. 1889. *T. Schu-*

manniana Mez in DC. Monogr. 9: 740. 1896. *T. Tonduziana* Mez, Bot. Jahrb. 30: Beibl. 67: 9. 1901. *T. orthiantha* Standl. Journ. Wash. Acad. Sci. 17: 248. 1927.

Extremely variable in habit, acaulescent, 2–7 dm. high. Leaves many, rosulate, usually forming an ovoid pseudobulb, 15–30 cm. long, densely punctulate-lepidote; sheath broadly elliptic, dark-brown; blade not over 2 cm. broad at base, narrowly triangular, involute-subulate at least near the apex, erect or recurved, pale-lepidote. Scape ferruginous- or pale-lepidote with minute spreading scales; scape bracts narrowly ovate, long-caudate, usually imbricate, densely appressed-lepidote. Inflorescence narrow, of 4–12 spikes, erect or pendulous; axis straight to strongly geniculate; primary bracts narrowly ovate, attenuate to caudate, densely appressed-lepidote. Spikes distichous, normally 8–12-flowered; floral bracts shorter than the sepals at maturity, ovate, acute, densely tomentose-lepidote. Flowers sessile, spreading, the terminal ones often abortive; sepals 5 mm. long, obovate, very asymmetric. Capsule cylindric, apiculate, 20–25 mm. long.

Epiphytic. Loreto: Cerro de Escalera, 1,200 meters, *Ule 6601*. —Junín: Thickets and open woods, Huacapistana, 1,800–2,400 meters, *Killip & Smith 24219*. Costa Rica, Colombia, Ecuador.

12. **Tillandsia tetrantha** R. & P. Fl. 3: 39. *pl. 265*. 1802. *Tussacia fulgens* Klotzsch ex Beer, Brom. 100. 1857. *T. aurantiaca* Griseb. Goett. Ges. Wiss. Nachr. 1864: 16. 1865. *Catopsis Garckeana* Wittm. Bot. Jahrb. 11: 70. 1889.

Extremely variable in habit, acaulescent, 4–8 dm. long. Leaves rosulate, densely punctulate-lepidote; sheath large, broadly elliptic, dark brown; blade 3–8 cm. broad, linear-lanceolate, usually flat, often irregularly purple-spotted. Scape usually much curved, its bracts elliptic, long-caudate, inflated, the sheaths shorter than the internodes. Inflorescence erect or pendulous; axis more or less geniculate, tomentose-lepidote, becoming glabrous; primary bracts broadly ovate, apiculate or short-caudate, usually as long as the spikes. Spikes distichous, often becoming secund-flowered, spreading or reflexed; rachis nearly straight; floral bracts shorter than the sepals (minute or wanting in the Peruvian variety), broadly ovate. Flowers spreading, sessile or short-stipitate; sepals asymmetric, obovate or oblong; petals slightly longer than the sepals; stamens included; ovary ovoid; style short. Capsule 3 cm. long, cylindric, acute with small beak.

Saxicolous and epiphytic. Huánuco: Muña, *Ruiz & Pavón.* Yanano, 2,000 meters, *3768.*—Cuzco: Prov. Calca, Lares Valley above Mantoc, 2,600–2,700 meters, *Weberbauer 7913.* Venezuela, Colombia, Ecuador.

13. **Tillandsia Gilliesii** Baker, Journ. Bot. 16: 240. 1878. *T. compressa* Gill. ex Baker, Journ. Bot. 16: 240. 1878, in synon., not Bertero. *T. andicola* Gill. of Wittm. in Reiss & Stuebel, Todtenfeld v. Ancon *pl. 106, f. 15,* not Gill.

Plant over 2 dm. long. Stems many from a single point, forming a dense mass, up to 8 cm. long, simple or few-branched. Roots present. Leaves distichous, 2–8 cm. long, densely subappressed-lepidote; sheaths broadly oblong, merging imperceptibly with the blade, densely imbricate, making the stem appear 5–7 mm. thick; blades arching-recurved, narrowly triangular, much compressed laterally, acuminate. Scape distinct to almost lacking, terminal or pseudoaxillary, up to 13 cm. long, appressed-lepidote, naked or bearing a single lanceolate, involute bract. Inflorescence 1–3-flowered, densely cinereous-lepidote. Floral bracts erect, lance-ovate, acute, 2 cm. long, usually equaling or exceeding the sepals, ecarinate, thin. Sepals oblong-lanceolate, 16 mm. long, lepidote, subfree; petals narrow; stamens deeply included, exceeding the pistil. Capsule slenderly cylindric, 25 mm. long.

Epiphytic. Arequipa: Below Tingo, *Rose 19014.* Arequipa, 2,500 meters, *Tate 1196.* Bolivia, Argentina.

14. **Tillandsia Landbeckii** Phil. Linnaea 33: 248. 1864. *T. recurvata* Auct., not L. 1762.

Flowering plant 3 dm. long. Stems densely massed, 2 dm. long, slender. Roots soon lost. Leaves laxly distichous, 6–12 cm. long, densely cinereous-lepidote; sheaths laxly imbricate; blades linear, terete, 1–1.5 mm. thick. Scape terminal, slender, densely cinereous-lepidote, its bracts 2 or 3 immediately below the inflorescence, linear-lanceolate, densely lepidote. Inflorescence 1–2-flowered. Floral bracts like the scape bracts, equaling the sepals. Sepals elliptic, acute, 1 cm. long, thin, sparsely lepidote, subfree; petals ligulate, obtuse, yellow; stamens deeply included, slightly exceeding the pistil. Capsule 22 mm. long.

Terrestrial and epiphytic. Ica: Foggy crests of Sangayán Island, 300–440 meters, *Murphy 3468.* Viejas Island, on crumbling rocks at summit, *Murphy 3221.* Ecuador, Chile.

15. **Tillandsia recurvata** L. Sp. Pl. ed. 2. 410. 1762. *Renealmia recurvata* L. Sp. Pl. 287. 1753. *T. uniflora* HBK. Nov. Gen. & Sp. 1: 290. 1816. *Diaphoranthema uniflora* Beer, Brom. 154. 1857. *D. recurvata* Beer, Brom. 156. 1857.

Plant 4–23 cm. long. Stems densely massed, simple or few-branched, 1–10 cm. long. Roots present. Leaves distichous, 3–17 cm. long, densely pruinose-lepidote; sheaths imbricate and completely concealing the stem; blades erect to recurved, linear, terete, 0.5–2 mm. in diameter. Scape terminal, slender, its bracts linear-lanceolate, usually only one immediately below the inflorescence. Inflorescence 1–5-flowered, dense. Floral bracts like the scape bracts, about equaling the sepals, densely lepidote. Sepals lanceolate, 4–9 mm. long, subfree, mostly glabrous; petals narrow, obtuse; stamens deeply included, exceeding the pistil. Capsule slenderly cylindric, up to 3 cm. long.

Terrestrial and epiphytic. Piura: Cerro Prieto, *Haught 215.*—Huánuco and Junín: *Ruiz & Pavón.*—Lima: Chosica, *2880.* Matucana, *457* in part. Obrajillo, *Mathews 650* in part. Southern United States to northern Argentina and Chile.

16. **Tillandsia capillaris** R. & P. Fl. 3: 42. *pl. 271, f. c.* 1802. *T. virescens* R. & P. Fl. 3: 43. *pl. 270, f. b.* 1802. *T. propinqua* Gay, Fl. Chil. 6: 15. 1853. *Diaphoranthema capillaris* Beer, Brom. 153. 1857. *D. virescens* Beer, Brom. 154. 1857. *T. lanuginosa* Gill. ex Baker, Journ. Bot. 16: 237. 1878, in synon. *T. pusilla* Gill. ex Baker, Journ. Bot. 16: 237. 1878. *T. incana* Gill. ex Baker, Journ. Bot. 16: 238. 1878, in synon. *T. cordobensis* Hieron. Icon. & Descr. Argent. 10. *pl. 3, f. 1.* 1885. *T. Stolpi* Phil. Anal. Univ. Chile 91: 614. 1895. *T. Hieronymi* Mez in DC. Monogr. 9: 876. 1896. *T. dependens* Hieron. ex Mez in DC. Monogr. 9: 880. 1896. *T. Williamsii* Rusby, Bull. N. Y. Bot. Gard. 6: 489. 1910.

Varying between several well-marked forms by numberless intergradations, caulescent, up to 16 cm. long. Roots present. Stems many from a single point, densely massed, simple or branched. Leaves distichous, mostly 1–4 cm. long, densely pruinose-lepidote; sheaths elliptic, thin; blades erect to spreading, linear and less than 2 mm. thick in the Peruvian forms. Scape often pseudo-axillary, from almost none to 8 cm. long, slender, naked, glabrous or sparsely lepidote toward the apex, developed almost wholly after anthesis. Inflorescence 1- or rarely 2-flowered. Floral bracts ovate, thin with 3 or more nerves, densely lepidote to glabrous, usually equaling or

exceeding the sepals. Sepals lanceolate, 8 mm. long, connate posteriorly; petals linear; stamens deeply included, exceeding the pistil.

Saxicolous and epiphytic. Huánuco: *Ruiz & Pavón.* Huánuco, 2,300 meters, *2035.*—Lima: Matucana, 2,700 meters, *457* in part; *Rose 18661.* Río Blanco, 3,000–3,500 meters, *Killip & Smith 21640.*—Junín: Tarma, 3,000–3,200 meters, *Mathews 650* in part; *Killip & Smith 21785, 21940.* Oroya, *Kalenborn 177*; *Stevens 14.* Casacancha to Culnai, *Wilkes Expedition.* Tarma to Oroya, *Weberbauer 2555.*—Cuzco: Ollantaitambo, 2,900–3,100 meters, *Cook & Gilbert 550; Pennell 13659.* Mollepata, valley of the Apurímac, 2,750 meters, *Herrera 1206.* Sicuani, 3,550 meters, *Hicken 10.* Cuzco, *Rose 19033; Herrera 47, 821; C. Watkins.*—Arequipa: Near Arequipa, 2,500 meters, *R. S. Williams 2530.* Yura, 2,800 meters, *R. S. Williams 2539.*—Puno: Near Puno, 3,125 meters, *Shepard 48.*—Indefinite: *Ruiz & Pavón; Dombey 162; C. Gay 546; Meyen; Stuebel.* Bolivia, Argentina, Chile. "Huachuacsso," "huayhuaço."

17. **Tillandsia usneoides** L. Sp. Pl. ed. 2. 411. 1762. *Renealmia usneoides* L. Sp. Pl. 287. 1753. *T. trichoides* HBK. Nov. Gen. & Sp. 1: 290. 1816. *Dendropogon usneoides* Raf. Fl. Tellur. 4: 25. 1838. *Strepsia usneoides* Steud. Nom. Bot. ed. 2. 2: 645. 1841. *T. crinita* Willd. ex Beer, Brom. 152. 1857.

Plant hanging from trees in branching strands up to 8 meters long. Roots lacking from the first. Stem sympodial, less than 1 mm. thick, the internodes 3–6 cm. long with only the extreme base covered by the leaf, the pseudo-axillary branches very short, concealed by the basal leaf, bearing 2–3 leaves. Leaves distichous, 25–50 mm. long, densely lepidote; sheaths elliptic, 8 mm. long; blades filiform, less than 1 mm. thick. Scape none. Inflorescence reduced to a single flower, pseudo-terminal. Floral bract ovate, apiculate or caudate, densely lepidote, shorter than the sepals. Sepals narrowly ovate, acute, 7 mm. long; petals linear, 11 mm. long, pale green or blue; stamens deeply included, exceeding the pistil; capsule cylindric, 25 mm. long, abruptly short-beaked.

Always epiphytic; widely distributed and common. Piura: Cerro Prieto, *Haught F-124.*—Huánuco: Near Huánuco, *2378.*—Lima: Matucana, *Rose 18671.*—Cuzco: Valle del Paucartambo, 3,000 meters, *Herrera 3378.* Cuzco, 3,200–3,500 meters, *Herrera 246, 820.* Ollantaitambo, 2,800 meters, *Herrera 128.* Hacienda

Capana, valley of the Paucartambo, *Herrera 39.*—Indefinite: *Ruiz & Pavón; A. Diehl 2566a; Dombey 161; Mathews 652; Philippi.* (See Weberbauer in Engler & Drude, Veg. Erde, Peruanischen Anden, for further details.) Southern United States to central Argentina and Chile. "Salvaje," "salvajina."

18. **Tillandsia bryoides** Griseb. ex Baker, Journ. Bot. 16: 236. 1878, emend. L. B. Smith, Proc. Amer. Acad. Sci. 70: 192. 1935. *T. coarctata* Gillies ex Baker, Journ. Bot. 16: 236. 1878, in synon., not Willd. 1830.

Habit like that of *Lycopodium Selago.* Stems many from a single point, densely massed, simple or few-branched, 5 cm. long. Leaves densely polystichous, strict, 4–9 mm. long; sheath ovate to suborbicular, as long as the blade, scarious, 3-nerved; blade subtriangular, acute, 2 mm. thick, densely cinereous-lepidote. Scape lacking or elongating only after anthesis, erect, slender, glabrous, usually naked, 3 cm. long. Inflorescence usually terminal, 1-flowered. Floral bract 7 mm. long, triangular-ovate, hyaline, 1-nerved, usually glabrous. Sepals narrowly elliptic, 5–9 mm. long, 3-nerved; petals linear, fleshy, yellow; stamens deeply included, exceeding the pistil. Capsule slenderly cylindric, 17 mm. long, abruptly short-beaked.

Epiphytic and saxicolous. Indefinite: *Gay 1574; Weberbauer.* Bolivia, Argentina.

19. **Tillandsia loliacea** Mart. ex R. & S. Syst. Veg. 7: 1204. 1830. *T. undulata* Baker, Journ. Bot. 16: 240. 1878. *T. quadriflora* Baker, Brom. 163. 1889, in part. *T. atrichoides* S. Moore, Trans. Linn. Soc. II. 4: 491. 1895.

Plants up to 17 cm. long. Roots present. Stem simple or branched, 4 cm. long. Leaves densely polystichous, 2–3 cm. long, densely and coarsely pruinose-lepidote; blades erect to arching-secund, rigid, linear-triangular, acuminate, 3–5 mm. broad. Scape terminal, up to 1 dm. long, less than 1 mm. thick, lepidote, its bracts numerous, about equaling the internodes, elliptic, acute, densely lepidote. Inflorescence simple, 4 cm. long; rachis geniculate, lepidote. Floral bracts remote, not at all imbricate, closely enfolding the flowers, ovate, acute, 8 mm. long, equaling or shorter than the sepals, thin, nerved, densely lepidote. Flowers erect and appressed to the rachis, subsessile; sepals lanceolate, acute, glabrous; petals narrow, 1 cm. long; stamens deeply included, exceeding the pistil. Capsule slenderly cylindric, short-beaked, 45 mm. long.

Terrestrial and epiphytic. Indefinite: *Mathews*. Brazil, Bolivia, Paraguay, Argentina.

20. **Tillandsia caerulea** HBK. Nov. Gen. & Sp. 1: 291. 1816. *T. squamulosa* Willd. ex R. & S. Syst. Veg. 7: 1209. 1830, in synon. *Diaphoranthema squamulosa* Beer, Brom. 266. 1857.

Plants up to 25 cm. long, sometimes pulvinate. Roots lacking. Stem simple, 4–6 cm. long. Leaves polystichous, 10–15 cm. long, densely spreading-lepidote, cinereous; sheaths ovate, 1 cm. long; blades spreading to reflexed, involute-subulate, soft, 2 mm. thick. Scape terminal, erect, 15 cm. long, 1 mm. thick, lepidote. Inflorescence simple, 4–7 cm. long, lax; rachis very slender, lepidote. Floral bracts divergent, closely enfolding the calyx, barely exceeding the internodes, elliptic, acute, 15 mm. long, equaling or exceeding the sepals, chartaceous, nerved, lepidote. Sepals lanceolate, acute, thin, glabrous; petals 2 cm. long, the claw linear, the blade subrhombic, 7 mm. wide, blue; stamens deeply included, exceeding the pistil.

Epiphytic. Piura: Río Macará, *Humboldt & Bonpland 3442*. Saucecito, about 40 miles north of Sullana, Negritos, *Haught F-11*. Amotape Mountains, *Haught 128*. Ecuador.

21. **Tillandsia aurea** Mez, Repert. Nov. Sp. 3: 44. 1906.

Stemless, 3 dm. high. Leaves irregularly rosulate, uncinate-recurved, coarsely pruinose-lepidote; sheaths scarcely distinct from the blades; blades narrowly triangular, acuminate, 75 mm. long, 15 mm. wide. Scape slender, elongate, erect, lepidote, its bracts narrow, acute or the lowest laminate, mostly shorter than the internodes, submembranaceous, densely lepidote. Inflorescence simple, laxly 6-flowered, 9 cm. long; axis undulate, densely lepidote. Floral bracts elliptic, acute, 14 mm. long, shorter than the sepals, submembranaceous, lepidote. Flowers divergent, the pedicels 2.5 mm. long; sepals lanceolate, acute, glabrous; petals yellow, the blades 1 cm. long, broadly elliptic, spreading; stamens deeply included, exceeding the pistil. Capsule cylindric, acuminate, 35 mm. long.

Epiphytic. Ancash: Prov. Huari, Puccha Valley above Masín, 2,600–2,700 meters, *Weberbauer 3297*. Endemic.

22. **Tillandsia cauligera** Mez, Repert. Nov. Sp. 3: 42. 1906.

Stem simple, 6 dm. long. Leaves densely polystichous, 21 cm. long, cinereous, densely pruinose-lepidote; sheath ovate, 30–45 mm.

broad, half as long as the blade and merging into it; blades suberect or slightly secund, triangular, acuminate, rigid. Scape terminal, erect, 3–25 cm. long, its bracts densely imbricate, striate, densely lepidote, the lower ones foliaceous-laminate, the upper acute or apiculate, often bright red. Inflorescence simple or rarely with a small second spike. Primary bract much shorter than the spike. Spike lanceolate or linear-lanceolate, acute, complanate, 8–9 cm. long, densely 10–14-flowered. Floral bracts 3–4 times as long as the internodes, completely concealing the rachis, ovate, 20–25 mm. long, exceeding the sepals, ecarinate, reddish, striate, lepidote. Sepals elliptic, chartaceous, soon glabrous, short-connate posteriorly; petals 37 mm. long, blue; stamens and style included.

Saxicolous. Cajamarca: Hacienda La Tahona, near Hualgayoc, 2,600 meters, *Weberbauer 4050.*—Junín: Between Tarma and Palca, 2,700–3,000 meters, *Weberbauer 2415.* Tarma, 3,000–3,200 meters, *Killip & Smith 21803.*—Cuzco: Ollantaitambo, 3,000 meters, *Cook & Gilbert 568, 785.* Cuzco, 3,000–3,600 meters, *Herrera.* Endemic. "Salvajina," "oquenhueycontoy."

23. **Tillandsia Macbrideana** L. B. Smith, Contr. Gray Herb. 89: 11. *pl. 2, f. 1–3.* 1930.

Plant over 3 dm. long. Roots present. Stem much branched. Leaves densely polystichous, 3–4 cm. long, densely appressed-lepidote, cinereous; sheath broadly elliptic, scarcely distinct from the blade and over half as long; blade triangular, acuminate, recurving. Scape none. Inflorescence terminal, simple, lanceolate, acute, 4 cm. long, 15 mm. broad, 5–10-flowered; rachis nearly straight, glabrous. Floral bracts erect, 3–4 times as long as the internodes but so narrow as to expose most of the rachis, lanceolate, 2 cm. long, exceeding the sepals, ecarinate, striate, submembranaceous, densely appressed-lepidote at first, rose. Sepals narrowly lanceolate, carinate, glabrous, connate posteriorly for 5 mm.; petals 25 mm. long, narrow, obtuse, rose; stamens and pistil shorter than the petals.

Saxicolous. Huánuco: On eastern face of rock cliffs, Llata, 2,100 meters, *2258.* Endemic.

24. **Tillandsia caulescens** Brongn. ex Baker, Brom. 168. 1889.

Plant up to 45 cm. long. Roots present. Stem much branched, 3 dm. long. Leaves very numerous, densely polystichous, rigid, 10–15 cm. long, densely appressed- or subpruinose-lepidote; sheath subtriangular, several times shorter than the blade; blade linear-

triangular, acuminate, involute, pungent. Scape distinct to almost none, terminal. Scape bracts densely imbricate, the lower foliaceous, the upper elliptic, nerved, roseate, lepidote. Inflorescence simple, linear or lance-linear, acute, complanate, 14-flowered, 5–7 cm. long, 10–12 mm. wide. Floral bracts erect, 3 times the length of the internodes, lance-ovate, acute, 15–20 mm. long, exceeding the sepals, ecarinate, subcoriaceous, faintly nerved, glabrous, roseate. Flowers 25 mm. long; sepals lanceolate, acute, glabrous; petals ligulate, white, exceeding the stamens and pistil.

Cuzco: Near Ollantaitambo, Prov. Urubamba, 2,900 meters, *Herrera 825.*—Indefinite: *C. Gay 1186.* Quebrada Versalles, *Diehl 2451.* Bolivia.

25. **Tillandsia paleacea** Presl, Rel. Haenk. 1: 125. 1827. *T. fusca* Baker, Journ. Bot. 16: 240. 1878. *T. scalarifolia* Baker, Journ. Bot. 25: 235. 1887. *T. Schenckiana* Wittm. Bot. Jahrb. 11: 63. 1889. *T. chilensis* Baker, Brom. 166. 1889. *T. lanata* Mez, Bull. Herb. Boiss. II. 5: 109. 1905. *T. favillosa* Mez, Repert. Nov. Spec. 3: 43. 1906.

Plant 1–7 dm. long. Roots present at first. Stem at least 35 cm. long, much branched. Leaves polystichous in few rows, cinereous, tomentose-lepidote; sheaths broad; blades abruptly spreading, contorted, linear-triangular, 4–6 mm. wide, involute-subulate, up to 12 cm. long. Scape slender, from very short to over 15 cm. long, glabrous or subglabrous, its bracts usually imbricate, narrowly elliptic, lepidote, the lower ones filiform-laminate. Inflorescence simple, linear-lanceolate, acute, complanate, 5 cm. long, 12-flowered. Floral bracts imbricate, 3 times as long as the internodes, ovate or elliptic, about equaling the sepals, 12–17 mm. long, ecarinate, nerved, lepidote at first. Sepals lanceolate, free, glabrous; petals with a narrow claw and a large, suborbicular, spreading, blue or violet blade; stamens deeply included, exceeding the pistil. Capsule cylindric, 2 cm. long.

Epiphytic and terrestrial. San Martín: Near Moyobamba, *Stuebel 62b.*—Lima: Obrajillo, *Brackenridge in Wilkes Exped.* Near Matucana, 2,370 meters, *Weberbauer 1697.* Chosica, 1,000 meters, *2879.*—Cuzco: Prov. Urubamba, near Ollantaitambo, 2,800–3,000 meters, *Weberbauer 4933; Cook & Gilbert 554; Herrera 702, 801.* Torontoy, Urubamba Valley, 2,400 meters, *Cook & Gilbert 1774.*—Arequipa: Cachendo, 1,000 meters, *Guenther & Buchtien 357.* Colombia, Bolivia, Chile.

26. **Tillandsia streptocarpa** Baker, Journ. Bot. 25: 241. 1887. *T. tricholepis* Baker, Journ. Bot. 25: 234. 1887, not Baker, Journ. Bot. 1878. *T. Bakeriana* Britten, Journ. Bot. 26: 170. 1888.

Stemless or short-caulescent, 4 dm. high. Leaves 25 cm. long, densely tomentose-lepidote; sheaths broadly ovate; blades linear-triangular, 15 mm. broad, involute-subulate at least toward the apex, recurving. Scape erect, slender, glabrous, its bracts lanceolate, acute, imbricate, striate, densely lepidote. Inflorescence compound or rarely simple; spikes 5–8-flowered, narrow, the lateral ones arching-decurved. Floral bracts lanceolate, acute, glabrous, shorter than the sepals. Flowers erect; sepals free, 12.5 mm. long, ecarinate, glabrous; petals 23 mm. long, the claw linear, the blade broadly obovate, violet; stamens deeply included, exceeding the pistil. Capsule cylindric.

Epiphytic. San Martín: Salinas de Pilluana on the Río Huallaga, *Ule 6663*.—Cuzco: Pumachaca, Santa Ana Valley, 1,400 meters, *Herrera 3314*.—Indefinite: *C. Gay 9093*. Brazil, Paraguay.

27. **Tillandsia Werdermannii** Harms, Notizbl. Bot. Gart. Berlin 10: 218. 1928.

At least 5 dm. long. Roots lacking. Stem procumbent, 2 dm. long, much branched, some of the branches apparently breaking away and serving to propagate the species vegetatively. Leaves densely polystichous, 15–20 cm. long, densely cinereous-lepidote; sheaths indistinct, mostly less than 3 cm. long; blades suberect, linear-triangular, 10–15 mm. broad, involute-subulate, rigid. Scape terminal, 2–3 dm. long, 4 mm. thick, glabrous, its bracts erect, densely imbricate, lanceolate, acute or acuminate, 5–8 cm. long, subcoriaceous, nerved, appressed-lepidote. Inflorescence simple, linear, 2 cm. broad, scarcely enlarged from the scape. Floral bracts like the scape bracts but glabrous, 4 cm. long, 3–4 times as long as the internodes, much exceeding the sepals, erect, ecarinate. Flowers very short-pedicellate; sepals linear-lanceolate, broadly acute, 25 mm. long, glabrous; petals many and stamens and pistil aborted as apparent beginning of a viviparous flower.

Terrestrial. Tacna: Above Tacna, 800–1,200 meters, *Werdermann 717*. Endemic.

28. **Tillandsia patula** Mez, Repert. Nov. Sp. 3: 35. 1906.

Cespitose, stout, 4 dm. high. Leaves subbulbous-rosulate, 2 dm. long, densely lepidote, brownish gray; sheath broad, ovate-triangular; blade 25 mm. broad, linear-triangular, acuminate, the

apex involute-subulate. Scape stout, its bracts imbricate, elliptic, lepidote, only the lowest laminate. Inflorescence simple, erect or pendulous. Floral bracts imbricate but so narrow as not to conceal the rachis, 45 mm. long, much exceeding the sepals, recurved-spreading at the apex, glabrous, striate. Rachis glabrous, straight, wing-angled. Flowers suberect, short-stipitate, 7 cm. long; sepals free, glabrous, elliptic, narrowly obtuse, 24 mm. long, nerved; petals yellow, tubular-erect, shorter than the stamens; style elongate.

Junín: Prov. Tarma, above Huacapistana on the Palca road, 1,900–2,000 meters, *Weberbauer 2012*. Carpapata, above Huacapistana, 2,400 meters, *Killip & Smith 24349*. Endemic.

29. **Tillandsia juruana** Ule, Verh. Bot. Ver. Brandenb. 48: 143. 1907.

Cespitose, 5 dm. high. Leaves rosulate, 36 cm. long, densely and finely appressed-lepidote, the outermost ones much reduced and scale-like; sheaths narrowly ovate, forming an ovoid pseudobulb; blades of the inner leaves linear, thick, abruptly acute. Scape erect or ascending, slender, its bracts broadly elliptic, amplexicaul, inflated, striate, all but the uppermost long-laminate. Inflorescence simple, distichous; rachis slender, geniculate, largely concealed by the bracts; floral bracts purple, submembranaceous, suborbicular, obtuse or minutely apiculate, 3 cm. long, much exceeding the sepals, densely and minutely appressed-lepidote. Flowers erect, 4–7 cm. long; sepals free, lanceolate, acute, 24 mm. long, finely appressed-lepidote; petals red, tubular-erect, shorter than the stamens; style elongate. Capsule cylindric, acute, beaked.

Epiphytic. Loreto: Mishuyacu, near Iquitos, 100 meters, *Killip & Smith 29914; Klug 1020, 1059, 1197*. Caballo-cocha on the Amazon, *Williams 2251*. Brazil.

30. **Tillandsia floribunda** HBK. Nov. Gen. & Sp. 1: 292. 1816. *Platystachys floribunda* Beer, Brom. 264. 1857. *T. coarctata* Willd. in R. & S. Syst. Veg. 7: 1217. 1830.

Cespitose, 2–3 dm. high. Leaves many, densely fasciculate, densely and finely cinereous-lepidote, 2–4 dm. long; sheaths subtriangular; blades filiform-subulate, stiff. Scape erect, its bracts leaf-like, densely imbricate. Inflorescence simple or of several densely digitate spikes; primary bracts like the scape bracts. Spikes sessile, lanceolate or linear-lanceolate, 12-flowered; floral bracts ovate, 11–15 mm. long, glabrous, even, strongly carinate, equaling the sepals, densely imbricate. Flowers subsessile, 2 cm. long; sepals

elliptic, acute, strongly carinate, coriaceous, glabrous; petals violet; stamens and pistil included.

Epiphytic. Piura: Aipate and Guamani Mountains near Olleros, *Humboldt & Bonpland.* Cape Pariñas, *Haught 213.* Cerro Prieto, Amotape Hills, 700 meters, *Haught F-127.* Ecuador.

31. **Tillandsia complanata** Benth. Bot. Sulph. 173. 1845. *T. axillaris* Griseb. Goett. Ges. Wiss. Nachr. 1864: 17. 1865.

Plant stemless. Leaves many in a dense rosette, 3–4 dm. long, mostly exceeding the inflorescences, spotted, streaked or suffused with dark purple especially toward the base; sheath elliptic, 10–16 cm. long, densely and minutely brown-appressed-lepidote; blade ligulate, abruptly acute or obtuse, apiculate, 3–5 cm. wide, obscurely punctulate-lepidote. Scapes many from the axils of the leaves, ascending, slender, glabrous, their bracts erect, usually imbricate, narrowly lanceolate. Inflorescences simple, lanceolate or linear, acute, densely 4–24-flowered, up to 8 cm. long, 15–20 mm. wide, complanate, glabrous. Floral bracts erect, imbricate, elliptic, obtuse, 15–25 mm. long, exceeding the sepals, ecarinate. Flowers subsessile; sepals lanceolate, acute, subcoriaceous, the posterior ones carinate and usually much connate; petals ligulate, 2 cm. long, rose, purple, or blue, obtuse; stamens and pistil slightly shorter than the petals. Capsule slenderly cylindric, acute, 4 cm. long.

Epiphytic. Amazonas: Heights east of Chachapoyas, *Weberbauer 4400.*—San Martín: San Roque, 1,350–1,500 meters, *Williams 7203.*—Junín: Huacapistana, 1,800 meters, *Killip & Smith 24280.* Antilles, Trinidad, Guiana, Venezuela, Colombia, Costa Rica, Ecuador, Bolivia.

32. **Tillandsia Walteri** Mez, Repert. Nov. Sp. 3: 43. 1906. *T. Herrerae* Harms, Notizbl. Bot. Gart. Berlin 10: 215. 1928.

Stemless, 5 dm. high. Leaves many, densely utriculate-rosulate, cinereous-lepidote; sheaths longer than the blades, narrowly ovate; blades narrowly triangular, 2 dm. long, 4 cm. wide. Scape stout, erect, its bracts imbricate, densely lepidote, rigid, nerved, the lower ones caudate. Inflorescence simple, densely distichous, 12–16-flowered, lanceolate, 2 dm. long, 4 cm. wide. Floral bracts imbricate, inflated, ecarinate, obtuse, broadly elliptic, 5 cm. long, exceeding the sepals, nerved. Flowers with stout pedicels 4 mm. long; sepals free, glabrous, nerved, obtuse; petals violet, 2 cm. longer than the sepals; stamens included.

Terrestrial. Amazonas: Open places on the route south of Chachapoyas, 2,400–2,500 meters, *Weberbauer 4319.*—Cuzco: Vicinity of Cuzco, *Herrera 181, 1195.* Bolivia.

33. **Tillandsia Lindeni** E. Morr. Belg. Hort. 19: 321. *pl. 18.* 1869, not *T. Lindeniana*, Regel, 1868. *Vriesia Lindeni* Lem. Ill. Hort. 16: *pl. 610.* 1869. *T. Morreniana* Regel, Gartenfl. 19: 41. 1870. *Wallisia Lindeni* E. Morr. Belg. Hort. 20: 102. 1870. *Phytarhiza Lindeni* E. Morr. ex Baker, Brom. 210. 1889, in synon.

Cespitose. Leaves rosulate, 2–3 dm. long; blades narrowly triangular, acuminate, 1–2 cm. broad, recurving. Scape erect, short, largely concealed by the leaves, its bracts even, densely imbricate, not at all foliaceous. Inflorescence simple, very dense, about 20-flowered, broadly lanceolate, complanate. Floral bracts broadly ovate, acute, 4 cm. long, exceeding the sepals, even, glabrous, deep rose when fresh. Flowers subsessile; sepals free, lanceolate, acuminate, glabrous; petals more than twice as long as the sepals, the claw linear, white, the blade very large, broadly ovate, apiculate, deep bluish purple; stamens deeply included, exceeding the pistil.

Epiphytic. Piura: Forests, Huancabamba, *Wallis.* Ecuador.

34. **Tillandsia platyrhachis** Mez in DC. Monogr. 9: 848. 1896.

Stemless, up to 6 dm. high. Leaves rosulate, 6–7 dm. long, densely and minutely pale-appressed-lepidote below, glabrous above; sheath ovate, inconspicuous; blade ligulate, acute, thin, 35 mm. broad. Scape stout, erect, its bracts foliaceous, densely imbricate. Inflorescence bipinnate or with the lowest branches slightly divided, lax, glabrous; primary bracts triangular, acuminate, minutely lepidote. Spikes short-stipitate, oblong, obtuse, 15 cm. long; rachis geniculate, broadly winged, forming pouches into which the flowers fit before maturity, the wings prolonged onto the base of each floral bract, whitish in drying; floral bracts suberect to spreading, elliptic, obtuse, 2–3 cm. long, much shorter than the sepals, striate, miniate, the margins white on drying. Flowers distinctly pedicellate; sepals free, elliptic, striate, the margins white on drying; petals 1 cm. longer than the sepals, the blade suborbicular, spreading, deep violet; stamens deeply included, exceeding the pistil.

Terrestrial. Junín: In dense forest, Schunke Hacienda above San Ramón, 1,400–1,700 meters, *Killip & Smith 24604.* Colombia, Ecuador.

35. **Tillandsia extensa** Mez, Repert. Nov. Sp. 3: 33. 1906.

One meter high. Leaves 8 dm. long, densely appressed-lepidote; sheath ovate, large; blade narrowly triangular, acuminate, 6 cm. broad at the base. Scape erect, stout, its bracts foliaceous, densely imbricate. Inflorescence amply 4-pinnate; axis stout; branches up to 4 dm. long, spreading, with a single prophyllum on the sterile base. Spikes linear, nearly straight, 16 cm. long, 15 mm. broad, densely 16-flowered; rachis glabrous, angled, sulcate; secondary bracts but slightly larger than the floral bracts. Floral bracts erect or nearly so, not imbricate, elliptic, much shorter than the sepals, glabrous, strongly nerved. Flowers stoutly pedicellate for 5 mm., 4 cm. long; sepals obtuse, 25 mm. long, glabrous, strongly nerved, ecarinate; petals ligulate, tubular-erect, violet; stamens exserted.

Saxicolous. Ancash: Valley above Masín, Prov. Huari, 2,500 meters, *Weberbauer 3296*. Endemic.

36. **Tillandsia humilis** Presl, Rel. Haenk. 1: 125. 1827. *T. Mathewsii* Baker, Journ. Bot. 25: 236. 1887. *T. Dombeyi* Baker, Brom. 199. 1889.

Short-caulescent, up to 3 dm. high. Leaves rosulate or polystichous along the stem, 13 cm. long, densely and coarsely tomentose-lepidote, cinereous; sheath scarcely distinct; blade narrowly triangular, acuminate, involute, recurving. Scape slender, erect, densely pale-lepidote, its bracts elliptic, imbricate, long-laminate. Inflorescence few-branched, ellipsoid, up to 9 cm. long; primary bracts elliptic, acute, densely lepidote, much shorter than the spikes. Spikes laxly few-flowered; rachis geniculate, densely white-lepidote. Floral bracts ovate, acuminate, much shorter than the sepals, purplish, densely lepidote. Flowers subsessile, 26 mm. long; sepals free, lanceolate, acuminate, 18 mm. long, membranaceous, densely lepidote; petals purple; stamens and pistil included.

Lima or Junín: Near Obrajillo and Tarma, *Mathews 651*.—Indefinite: *Haenke; Dombey*. Endemic.

37. **Tillandsia aureobrunnea** Mez, Repert. Nov. Sp. 3: 36. 1906.

Stemless or short-caulescent, up to 4 dm. high. Leaves densely and coarsely pruinose-lepidote, up to 3 dm. long, 25 mm. wide; sheath scarcely distinct; blade narrowly triangular, acuminate. Scape slender, erect, shorter than the leaves, densely lepidote, its bracts involute, densely lepidote, long-laminate. Inflorescence of a

few spikes; primary bracts elliptic, acute, shorter than the spikes. Spikes laxly 7-flowered, suberect, 6 cm. long; rachis geniculate, densely lepidote. Floral bracts elliptic, acute, much shorter than the sepals, ecarinate. Flowers short-pedicellate, 25 mm. long; sepals free, elliptic, acute, 18 mm. long, densely lepidote; petal blade subtrapeziform, yellow with brown spots; stamens and pistil included.

Epiphytic and saxicolous. Cajamarca: Near San Miguel, Prov. Hualgayoc, 2,200 meters, *Weberbauer 3921*.—Huánuco: Llata, 2,300 meters, *2256*.—Lima: Canta, *Pennell 14743*. Near Matucana, *Rose 18662*. Endemic.

38. **Tillandsia brevilingua** Mez ex Harms in Engl. & Prantl, Nat. Pflanzenf. ed. 2. 15a: 132. 1930. *Catopsis latifolia* Ule, Verh. Bot. Ver. Brandenb. 48: 142. 1907, not *T. latifolia* Meyen, 1843.

Stemless, 3 dm. high. Leaves rosulate, 16–20 cm. long, sparsely fine-lepidote; sheaths elliptic, 45 mm. broad; blades ligulate, broadly rounded, apiculate, 35 mm. wide. Scape erect, slender, exceeding the leaves, its bracts broadly elliptic, apiculate, roseate. Inflorescence of a few spikes, digitate; primary bracts like the scape bracts, much shorter than the spikes. Spikes lanceolate, densely 6-flowered; floral bracts erect, densely imbricate, elliptic, acute, 26 mm. long, exceeding the sepals, carinate, glabrous, striate, roseate, incurved at the apex. Flowers sessile, 3 cm. long; sepals free, narrowly ovate, carinate; petals ligulate, blue; stamens and pistil included.

Epiphytic. Loreto: Cerro de Escalera, 1,200 meters, *Ule 61p*. Endemic.

39. **Tillandsia tectorum** E. Morr. Belg. Hort. 27: 328. *pl. 18*. 1877. *T. argentea* C. Koch, Cat. Verschaff. 4. 1867, not Griseb. 1866. *T. saxicola* Mez, Repert. Nov. Sp. 3: 41. 1906.

Caulescent, 3–5 dm. long. Leaves densely imbricated along the stem, polystichous, densely tomentose-lepidote, up to 2 dm. long, cinereous to fuscous; sheaths triangular-ovate; blades involute-subulate, spreading, the apex filiform. Scape slender, erect, much exceeding the leaves, its bracts imbricate, involute, broadly ovate, filiform-laminate, reddish. Inflorescence compactly digitate from about 5 spikes; primary bracts like the scape bracts, much shorter than the spikes. Spikes sessile, densely 7-flowered, lanceolate, complanate. Floral bracts imbricate, lanceolate, acute, about equaling the sepals, soon glabrous, red and green or roseate, carinate. Flowers 20–25 mm. long; sepals free, lanceolate, glabrous, 1 cm.

long; petals tubular-erect, white with a blue band below the apex; stamens included; style elongate.

Saxicolous. Piura: Huancabamba, *Roezl.*—Ancash: Between Huaraz and Carhuaz, 2,700 meters, *Weberbauer 3290.*—Huánuco: Llata, 2,300 meters, *2299.* Huánuco, 2,700 meters, *Kanehira 91.*—Junín: Between Tarma and Palca, *Weberbauer 2412.*—Lima: Along Río Chillón, near Viscas, 2,000–2,300 meters, *Pennell 14443.* Caballeros and Obrajillo, *Wilkes Exped.* Endemic.

40. **Tillandsia heteromorpha** Mez, Repert. Nov. Sp. 3: 41. 1906.

Prostrate, caulescent, 2–3 dm. long. Leaves densely imbricate along the stem, polystichous, mostly secund-curving, 55 mm. long, densely appressed-lepidote; blade 7 mm. wide, subulate, acuminate, rigid. Scape very short, exceeded by the leaves, its bracts imbricate, mostly laminate, submembranaceous, lepidote, striate. Inflorescence ellipsoid or globose, 25 mm. long; primary bracts elliptic, acute, all somewhat shorter than the spikes, lepidote, membranaceous, striate. Spikes 5-flowered, sessile, lanceolate, 2 cm. long. Floral bracts imbricate, acute, carinate, finely lepidote, 12 mm. long. Flowers subsessile, 17 mm. long; sepals free, acute, carinate, glabrous, 12 mm. long; petals erect, violet with white apices; stamens and pistil included.

Saxicolous. Ancash: Prov. Huari, valley of Río Puccha above Masín, *Weberbauer 3742.* Endemic.

41. **Tillandsia disticha** HBK. Nov. Gen. & Sp. 1: 292. 1816. *T. cinerascens* Willd. ex R. & S. Syst. Veg. 7: 1218. 1830. *Platystachys cinerascens* Beer, Brom. 263. 1857.

Stemless, up to 3 dm. high. Leaves bulbous-rosulate, 3 dm. long, appressed-cinereous-lepidote; sheaths broadly ovate to orbicular, inflated, with large scales on the margins forming an irregularly dentate, membranous border; blades involute-subulate, 3 mm. broad, erect, filiform-acuminate. Scape slender, erect or ascending, shorter than the leaves, its bracts imbricate, lanceolate, filiform-laminate, lepidote with particularly large scales on the margins. Inflorescence digitate from 3–8 spikes; primary bracts lanceolate, acuminate, much shorter than the spikes. Spikes subsessile, linear, about 12-flowered, 4 cm. long, 8 mm. wide. Floral bracts imbricate, triangular, acute, 7–10 mm. long, exceeding the sepals, carinate, striate, subglabrous. Flowers subsessile, 13 mm. long; sepals acute, carinate, glabrous;

petals yellow, the blade narrowly lanceolate; stamens and pistil included.

Epiphytic. Piura: Ayavaca, *Humboldt & Bonpland.* Cerro Prieto, 700 meters, *Haught 214, F-126.* Ecuador.

42. **Tillandsia juncea** (R. & P.) LeConte, Ann. Lyc. N. Y. 2: 130. 1828. *Bonapartea juncea* R. & P. Fl. 3: 38. *pl. 262.* 1802. *Misandra juncea* F. C. Dietr. Vollst. Gaertn. Nachtr. 5: 103. 1819. *Acanthospora juncea* Spreng. Syst. 2: 25. 1825. *T. quadrangularis* Mart. & Gal. Bull. Acad. Brux. 10, pt. 2: 9. 1843. *Platystachys juncea* Beer, Brom. 86. 1857. *T. juncifolia* Regel, Gartenfl. 23: 321. *pl. 811.* 1874.

Stemless, often propagating by scaly, branching rhizomes, 2–4 dm. high. Leaves numerous in a dense, fasciculate rosette, densely and minutely subappressed-lepidote, the sheath triangular-ovate, ferruginous; blade setaceous, filiform-acuminate. Scape erect or ascending, stout, its bracts densely imbricate, lanceolate, filiform-laminate, densely lepidote. Inflorescence very densely digitate from a few spikes or reduced to a single densely polystichous-flowered spike, ovoid; primary bracts like the upper scape bracts, their sheaths slightly shorter than the lower axillary spikes. Spikes sessile, elliptic or lanceolate, acute, up to 4 cm. long, stout, slightly complanate. Floral bracts densely imbricate, broadly ovate, acute or obtuse, exceeding the sepals, carinate in the distichous-flowered spikes, coriaceous, nearly or quite even, densely lepidote. Flowers subsessile; sepals lanceolate, acute, 15–20 mm. long, coriaceous, much connate posteriorly; petals tubular-erect, 4 cm. long, violet; stamens and pistil exserted.

Epiphytic and saxicolous. Huánuco: Near Muña, *Ruiz & Pavón.* Mexico and the Antilles south to Venezuela and Peru.

43. **Tillandsia latifolia** Meyen, Reise 437. 1843. *T. divaricata* Benth. Bot. Sulph. 174. 1845. *T. Kunthiana* Gaud. Atl. Bonite *pl. 53.* 1846. *Platystachys Kunthiana* Beer, Brom. 90. 1857. *P. latifolia* C. Koch, Ind. Sem. Hort. Berol. App. 4: 5. 1873. *T. grisea* Baker, Journ. Bot. 25: 245. 1887. *T. oxysepala* Baker, Journ. Bot. 26: 141. 1888. *T. murorum* Mez, Repert. Sp. Nov. 12: 420. 1913.

Caulescent or acaulescent, very variable, up to 6 dm. high. Leaves densely gray-appressed-lepidote; sheath scarcely distinct; blade narrowly triangular, filiform-acuminate, usually spreading or recurved. Scape erect, its bracts imbricate, gray-lepidote, narrowly laminate, the tips spreading or recurved. Inflorescence bipinnate or

rarely simple, dense with erect spikes or lax with spreading spikes, sometimes viviparous; primary bracts like the scape bracts, usually shorter than the spikes. Spikes subsessile, densely 6–12-flowered, lanceolate. Floral bracts densely imbricate, broadly ovate, acute, 15–20 mm. long, equaling or exceeding the sepals, carinate, gray-lepidote, at length glabrous. Flowers subsessile; sepals acute, carinate, slightly lepidote, connate posteriorly; petals narrow; stamens and pistil included.

Common on rocks and sand, chiefly near the coast. Piura: Near Paita, *Gaudichaud*. Cerro Prieto, east of Cape Pariñas, 600–800 meters, *Haught 128, 190*.—Lima: Callao, 1852, *N. J. Andersson*. San Lorenzo, *Wilkes Exped.; Hombrón*. Obrajillo, *Wilkes Exped*. Near Lima, *Wawra 2562, 2655* in part; *Cuming 981; Gaudichaud 64*. Baños, *Wilkes Exped*. Lurín, *5929*. Valley of the Rímac near Santa Clara, *Seler 253*.—Ica: Sangayán Island, *Murphy 3482*.—Arequipa: Near Islay, 100 meters, *Meyen*. Quebrada of Guerreros, *Bridges*. Cachendo, 1,100 meters, *Guenther & Buchtien 356*. Upper valleys, lomas, Mollendo, over 200 meters, *Stafford 284*. Colombia, Ecuador.

44. **Tillandsia subandina** (Ule) Mez ex L. B. Smith, Contr. Gray Herb. 98: 16. 1932. *Cipuropsis subandina* Ule, Verh. Bot. Ver. Brandenb. 48: 148. 1907.

Stemless, 7 dm. high. Leaves rosulate, 6 dm. long, minutely appressed-lepidote below; sheaths narrow; blades linear, erect, 15 mm. wide, acuminate, flat. Scape slender, erect, its bracts imbricate, acute. Inflorescence of a few spikes; primary bracts elliptic, acuminate, much shorter than the spikes. Spikes suberect, lanceolate, 4–7 cm. long, 6–12-flowered. Floral bracts imbricate, elliptic, acuminate, 2 cm. long, exceeding the sepals, strongly carinate, glabrous. Flowers 22 mm. long, pedicellate for 3 mm.; sepals lanceolate, acute, carinate; petals yellow, with two vertical auricled calli each (*Mez!*); stamens and pistil included.

Terrestrial. Loreto: Cerro de Isco, 1,000 meters, *Ule 6684*. Endemic.

45. **Tillandsia adpressiflora** Mez in DC. Monogr. 9: 661. 1896.

Stemless, 12–15 dm. high. Leaves up to 4 dm. long, densely and minutely appressed-lepidote; sheaths suborbicular, large, dark brown; blades narrowly triangular, 4 cm. broad, filiform-acuminate, cinereous. Scape stout, erect, its bracts leaf-like, densely imbricate. Inflorescence laxly paniculate, red; primary bracts narrowly lanceolate, acute, scarcely larger than the floral bracts, involute about the

sterile base of the spike. Spikes spreading, linear, elongate, laxly 6–13-flowered with several involute sterile bracts at the base; rachis nearly straight, sulcate. Floral bracts narrowly lanceolate, 5 cm. long, tubular-involute around the flower and rachis together, much exceeding the sepals, but slightly longer than the internodes, subglabrous, ecarinate. Flowers subsessile, 6–7 cm. long; sepals narrowly lanceolate, free, acute; petals violet, slightly exceeding the stamens and pistil.

Epiphytic. Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 1184*. Surinam, Brazil.

46. **Tillandsia maculata** R. & P. Fl. 3: 40. *pl. 267*. 1802. *Vriesia maculata* Beer, Brom. 98. 1857.

Stemless, 1–2 meters high. Leaves rosulate, 1 meter long, obscurely punctulate-lepidote; sheath ovate, brown; blade linear, 4 cm. broad, acuminate, often irregularly spotted. Scape erect, its bracts triangular, the lower ones acuminate and exceeding the internodes. Inflorescence 3–4-pinnate, pyramidal, red; primary bracts lanceolate, acute, shorter than the branches or spikes. Spikes oblong, laxly 12–20-flowered; rachis glabrous, sulcate, strongly angled, nearly straight. Floral bracts elliptic, narrowly obtuse, 2 cm. long, exceeding the sepals, somewhat spreading and not concealing the rachis, carinate toward the apex, strongly nerved, membranaceous. Flowers suberect, sessile, 23 mm. long; sepals lanceolate, acute, all slightly connate at the base, glabrous, strongly nerved; petals violet; stamens and pistil included.

Epiphytic and saxicolous. Cajamarca: Northwest of Hualgayoc, *Weberbauer 4088*.—Huánuco: Muña, Chaclla, Posuso, Chinchao, Cochero, *Ruiz & Pavón*. Pampayacu, *Poeppig 1528*. Pampayacu, hacienda at mouth of Río Chinchao, 1,200 meters, *5094*. Endemic. "Pucca-huehle."

47. **Tillandsia Arnoldiana** Harms, Notizbl. Bot. Gart. Berlin 10: 579. 1929.

Stemless, 13–15 dm. high. Leaves rosulate, 5–7 dm. long, glabrous above, obscurely punctulate-lepidote below; sheath large; blade ligulate, 7–10 cm. broad, rounded-triangular at the apex, apiculate. Scape erect, its bracts broadly ovate, acute or apiculate, imbricate. Inflorescence laxly 3–4-pinnate; primary bracts lanceolate, enfolding the sterile base of the branch; branches and spikes with one or more prophylla at the base. Spikes linear-lanceolate, 6–10-flowered, nearly straight, 4–9 cm. long (including the sterile

base). Floral bracts imbricate, ovate-oblong, 13–15 mm. long, acute or rounded-apiculate, carinate toward the apex, glabrous, striate. Flowers 2 cm. long, subsessile; sepals free, oblong, obtuse, strongly carinate, glabrous, striate; petals narrow, erect; stamens and pistil included.

Epiphytic. Junín: Huacapistana, 1,800 meters, *Killip & Smith 24298*. Colombia.

48. **Tillandsia platyphylla** Mez, Repert. Nov. Sp. 3: 37. 1906.

Probably over 1 meter high, but known only from fragments. Leaves rosulate, 1 meter long, subglabrous; sheaths large, dark brown; blades ligulate, 1 dm. wide, acute, apiculate. Inflorescence amply 3-pinnate; axis stout, glabrous; primary bracts short, triangular; branches suberect, bearing 2 sterile bracts at the base. Spikes linear, 20-flowered, 22 cm. long, 11 mm. wide, arching-decurved. Floral bracts 2 cm. long, obtuse, exceeding the sepals, ecarinate, glabrous, strongly nerved. Flowers erect, subsessile, 23 mm. long; sepals coriaceous, glabrous, strongly nerved, obtuse; petals violet, the blade narrowly elliptic, acute; stamens and pistil included.

Saxicolous. Cajamarca: Between San Pablo and San Miguel, 1,700 meters, *Weberbauer 3888*. Endemic.

49. **Tillandsia rubra** R. & P. Fl. 3: 40. *pl. 266*. 1802. *T. paniculata* Cham. & Schlecht. Linnaea 6: 54. 1831, not L. 1762. *T. Deppeana* Steud. Nom. Bot. ed. 2. 2: 688. 1841. *Vriesia rubra* Beer, Brom. 98. 1857. *T. Fendleri* Griseb. Goett. Ges. Wiss. Nachr. 1864: 17. 1865. *T. excelsa* var. *latifolia* Griseb. Goett. Ges. Wiss. Nachr. 1864: 17. 1865. *T. Kalbreyeri* Baker, Journ. Bot. 26: 45. 1888. *T. pyramidata* André, Brom. Andr. 86. 1889. *Phytarhiza rubra* E. Morr. ex Baker, Brom. 206. 1889. *T. leiochlamys* Baker, Brom. 184. 1889. *T. clavigera* Mez in DC. Monogr. 9: 783. 1896. *T. Bangii* Baker, Mem. Torrey Club 6: 124. 1896. *T. macrodactylon* Mez, Repert. Nov. Sp. 3: 39. 1906.

Stemless, 1–2 meters high. Leaves densely rosulate; sheath subovate, inconspicuous; blade ligulate, up to 8 cm. broad, triangular-acute. Scape stout, erect, its bracts leaf-like, imbricate. Inflorescence amply bipinnate or tripinnate, lax; primary bracts like the upper scape bracts, much shorter than the spikes. Spikes lanceolate, acute, complanate, densely 6–28-flowered, 1–3 dm. long, up to 5 cm. wide, often spreading or recurved, more or less stipitate with sterile bracts at the base. Floral bracts narrowly obovate, keeled at the apex, glabrous, even, about equaling the sepals. Flowers erect,

short-stipitate; sepals equally subfree, up to 45 mm. long, oblong-lanceolate, carinate; petals slightly exceeding the stamens.

Terrestrial and epiphytic. Huánuco: Huacachi, near Muña, 2,200 meters, *4192*. Yanahuanca, 3,300 meters, *1255*. Yanano, 2,000 meters, *3766*, *3852*, *4920*. Cani, near Mito, 2,800 meters, *3435*.—Junín: Near Tarma, *Ruiz & Pavón*. Above Huacapistana on the Palca road, 2,000–2,100 meters, *Weberbauer 2049*. Below Huacapistana, 1,600–1,800 meters, *Weberbauer*. Carpapata, above Huacapistana, 2,400 meters, *Killip & Smith 24357*.—Cuzco: Valley of the Urubamba between Cedrobamba and La Máquina, 2,060–2,260 meters, *Herrera 2037*. Mexico and the Antilles to Venezuela, Peru, and Bolivia. "Huehle."

50. **Tillandsia Ulei** Mez, Bull. Herb. Boiss. II. 5: 102. 1905. *T. glumaciflora* Ule, Verh. Bot. Ver. Brandenb. 48: 143. 1907.

Stemless, 25 cm. high. Leaves bulbous-rosulate, 25 cm. long, densely and finely appressed-lepidote; sheaths large, suborbicular, dark brown; blades 1 cm. broad, narrowly triangular, involute-subulate, cinereous. Scape slender, erect or arching, half as long as the leaves, its bracts broadly elliptic with long, filiform laminae. Inflorescence bipinnate from about 12 spikes, distichous; primary bracts broadly elliptic, acuminate, erect, barely exceeding the sterile base of the spike, lepidote. Spikes suberect to spreading, bearing several prophylla on the erect sterile base, linear-lanceolate, 20-flowered. Floral bracts imbricate, slightly shorter than the sepals, ecarinate, subchartaceous, lepidote, strongly nerved, acute. Flowers subsessile, erect; sepals free, narrowly elliptic, obtuse; petals white, entire, exceeding the stamens and pistil.

Epiphytic. Loreto: Cerro de Escalera, 1,300 meters, *Ule 54p*. Endemic, but very closely related to *T. didistichoides* Mez of Trinidad and Venezuela.

51. **Tillandsia Harmsiana** L. B. Smith, Contr. Gray Herb. 98: 16. *pl. 4, f. 12–15*. 1932.

At least 6 dm. high. Leaves narrowly triangular, acuminate, 6 dm. long, 4 cm. wide, densely appressed-cinereous-lepidote throughout. Scape erect, stout, its bracts densely imbricate, ovate with long, narrow, recurving laminae. Inflorescence bipinnate from about 7 spikes, densely cylindric, 3 dm. long, less than 5 cm. thick; axis wholly concealed; primary bracts ovate, acute, erect, tightly sheathing the base of the spikes. Spikes straight, stiffly erect, linear-lanceolate, acute, 11–15 cm. long, 3 cm. wide, 12–20-flowered;

rachis densely lepidote, deeply excavated opposite the flowers. Floral bracts imbricate, ovate, acute, 3–4 cm. long, exceeding the sepals but not wholly concealing the rachis, carinate, sparsely lepidote, yellow-brown with dark purple at the base. Flowers stipitate, 5 cm. long; sepals free, narrowly ovate, 3 cm. long, glabrous, ecarinate; petals narrow, purple, each with 2 vertical auricled calli; stamens about equaling the petals; pistil exserted.

Huánuco: Steep, rocky, shrubby slopes, Mito, 3,000 meters, *3272*. Endemic.

52. **Tillandsia cereicola** Mez, Repert. Nov. Sp. 3: 34. 1906.

Stemless, up to 1 meter high (extended). Leaves rosulate, 3 dm. long, densely subappressed-lepidote; sheaths broadly elliptic, dark brown; blades narrowly triangular, 4 cm. wide, acuminate, the apex angular-subulate. Scape stout, arching-decurved, about equaling the leaves, its bracts imbricate, the lower short-laminate, the upper obtuse. Inflorescence pendulous, of 3–4 spikes; primary bracts but slightly larger than the floral bracts, enfolding the base of the spike. Spikes linear-lanceolate, 3 dm. long, 18-flowered, bearing several sterile bracts at the base, complanate. Floral bracts imbricate, lanceolate, obtuse, 35 mm. long, much exceeding the sepals, ecarinate. Flowers 52 mm. long (with pistil), erect, pedicellate for 3 mm.; sepals free, coriaceous, glabrous, acute; petals tubular-erect, violet; stamens and pistil exserted.

Epiphytic. Ancash: Near Caraz, 2,200 meters, *Weberbauer 3025*. Endemic.

53. **Tillandsia purpurea** R. & P. Fl. 3: 41. *pl. 270, f. a.* 1802. *T. azurea* Presl, Rel. Haenk. 1: 124. *pl. 24.* 1827. *T. longebracteata* Meyen, Reise 438. 1843, in synon. *Anoplophytum longebracteatum* Beer, Brom. 264. 1857. *Platystachys purpurea* Beer, Brom. 89. 1857. *Phytarhiza purpurea* E. Morr. ex Baker, Brom. 167. 1889.

Very variable, stemless to long-caulescent, up to 7 dm. long. Leaves rosulate or distributed along the stem, polystichous, 1–2 dm. long, cinereous, densely tomentose-lepidote; sheath not distinct; blade narrowly triangular, 14 mm. wide, filiform-acuminate, recurving. Scape slender, erect, variable in length, its bracts imbricate, narrowly elliptic, filiform-laminate, densely lepidote. Inflorescence bipinnate; primary bracts lanceolate, acute, lepidote, purple, shorter than the spikes. Spikes laxly 7-flowered, lanceolate; rachis geniculate, exposed. Floral bracts subspreading, lanceolate, acute, 15–20 mm. long, slightly exceeding the sepals, carinate, incurved,

glabrous, stramineous, finely striate. Flowers pedicellate; sepals lanceolate, glabrous; petals purple or blue and white, the blade narrowly ovate; stamens and pistil included.

On sandy lomas or on ledges. Huánuco: Llata, 2,300 meters, *2298*. Near Huánuco, *Haenke*.—Lima: Obrajillo, *Brackenridge*. Lurín, *5930*. Canta, Huarochiri, and near Lima, *Ruiz & Pavón*. Near Lima, *Cuming 981* in part; *Dombey 142; Wawra 2655* in part; *W. Nation*. Santa Clara, *Rose 19480*.—Junín: Uspachaca, 2,800 meters, *1314*.—Arequipa: Near Islai, *Meyen*. Endemic. "Cardo de lomas."

54. **Tillandsia straminea** HBK. Nov. Gen. & Sp. 1: 292. 1816. *T. scoparia* Willd. ex R. & S. Syst. Veg. 7: 1217. 1830. *Platystachys scoparia* Beer, Brom. 265. 1857.

Stemless, up to 5 dm. high. Leaves rosulate, spreading, 25 cm. long, densely tomentose-lepidote, fuscous or cinereous; sheath not distinct; blade narrowly triangular, 14 mm. wide, filiform-acuminate. Scape slender, erect, its bracts imbricate, narrow, submembranaceous, stramineous, lepidote, filiform-laminate. Inflorescence bipinnate, glabrous; primary bracts lanceolate, shorter than the spikes, stramineous, glabrous. Spikes laxly 6–8-flowered; rachis geniculate. Floral bracts spreading, ovate, acute, 18 mm. long, about equaling the sepals, closely and finely nerved, carinate. Flowers 22 mm. long; sepals ovate; petals purple; stamens included.

Epiphytic. Piura: Near Olleros, *Humboldt & Bonpland 3496*.—Huánuco: Near Huánuco, *Haenke*.—Lima: Ruins of Cajamarquilla, Rímac Valley, *Seler 252*. Ecuador.

55. **Tillandsia Gayi** Baker, Brom. 179. 1889.

Stemless, 4 dm. high. Leaves rosulate, 25 cm. long, pruinose-lepidote; sheath narrowly ovate, not distinct; blade narrowly triangular, 1 cm. wide. Scape erect, glabrous, its bracts imbricate, red, elliptic, lepidote, the lower laminate. Inflorescence densely bipinnate; primary bracts like the upper scape bracts, suberect, shorter than the spikes, acute, sparsely lepidote. Spikes erect, 8–10-flowered, red, subsessile, lanceolate. Floral bracts imbricate, ovate-elliptic, 16 mm. long, ecarinate, glabrous, strongly nerved. Flowers subsessile, 2 cm. long; sepals lanceolate, obtuse, 14 mm. long; petals spreading at the apex, exceeding the stamens and pistil, white(?).

Indefinite: *Gay*. Endemic.

56. **Tillandsia oroyensis** Mez, Repert. Sp. Nov. 16: 77. 1919.

Stout, 5 dm. high. Leaves rosulate, 3 dm. long, densely subappressed-lepidote; blade narrowly triangular, rigid, 25 mm. wide. Scape stout, erect, its bracts lax, ovate-elliptic, laminate. Inflorescence bipinnate or the lowest branches digitate-divided, subclavate, dense above, interrupted below; primary bracts ample but even the lowest somewhat shorter than the axillary spikes, laminate or apiculate, lepidote. Spikes erect, sessile, laxly 6-flowered, subelliptic, acute, 35 mm. long. Floral bracts suberect, 10–15 mm. long, distinctly shorter than the sepals at maturity, ecarinate, glabrous, obtuse-mucronate, strongly nerved. Flowers 18 mm. long; sepals nearly free, ovate, acute, carinate, glabrous; petals bright purple.

Huánuco: Yanahuanca, 3,300 meters, *1161*.—Junín: Between Tarma and La Oroya, *Weberbauer 2523*. Endemic.

57. **Tillandsia Roezli** E. Morr. Belg. Hort. 27: 272. *pl. 15*. 1877. *Allardtia Roezlii* E. Morr. ex Baker, Brom. 207. 1889. *Vriesea Roezlii* Hort. Linden ex E. Morr. in Baker, Brom. 207. 1889.

Stemless, up to 5 dm. high. Leaves rosulate, 4 dm. long; sheath elliptic, slightly inflated; blade ligulate, acute, 35 mm. wide, green with irregular brown-black cross bands. Scape erect, glabrous, its bracts imbricate, lanceolate, acuminate, spreading at the apex. Inflorescence laxly bipinnate from a few spikes; primary bracts spreading, lanceolate, acuminate, shorter than the spikes, reddish. Spikes narrowly lanceolate, subsessile, 6–10 cm. long. Floral bracts densely imbricate, lanceolate, acute, 3 cm. long, exceeding the sepals, green with a red apex, lustrous. Flowers sessile, 4 cm. long; sepals free, lanceolate, acuminate; petals erect, lilac; stamens and pistil included.

Terrestrial. Indefinite: Northern Peru (probably in or near the department of Junín), *Roezl*. Endemic.

58. **Tillandsia pinnato-digitata** Mez, Repert. Nov. Sp. 3: 39. 1906.

More than 5 dm. high. Leaves subpruinose, cinereous-lepidote. Scape stout, erect, glabrous, its bracts densely imbricate, cinereous-lepidote, with long involute-subulate laminae. Inflorescence broadly thyrsoid, tripinnate, lax below, dense above, 3 dm. long, 11 cm. thick; primary bracts ample, the lower ones long-laminate and exceeding the axillary branches, the upper ones acuminate. Spikes digitate at the end of short naked branches, sessile, 10-flowered, broadly lanceolate, suberect to spreading, 6 cm. long, 14 mm. wide,

compressed. Floral bracts densely imbricate, concealing the rachis, ovate-triangular, 18 mm. long, red, striate, coriaceous. Flowers subsessile, 23 mm. long; sepals acute, glabrous, connate posteriorly for 8 mm.; petals ligulate, violet.

Saxicolous. Ancash: Prov. Cajatambo, near Ocros, 2,400–2,900 meters, *Weberbauer 2736* in part. Endemic.

59. **Tillandsia interrupta** Mez, Repert. Nov. Sp. 3: 38. 1906.

Stemless, up to 1 meter high. Leaves rosulate, 1 meter long, densely and finely appressed-lepidote; sheaths narrowly elliptic, chestnut; blades narrowly triangular, 4 cm. broad, filiform-acuminate, cinereous. Scape stout, erect, its bracts imbricate, subinflated, long-laminate. Inflorescence thyrsoid, interrupted at the base, dense above, 5 dm. long; axis stout, glabrous; primary bracts broadly elliptic, exceeding the lower and middle spikes, inflated, the lower ones long-laminate. Spikes suberect to spreading, sessile, densely 10–12-flowered, narrowly lanceolate, 7 cm. long, compressed. Floral bracts ecarinate, 17 mm. long, equaling or slightly shorter than the sepals, acute, glabrous, strongly nerved, coriaceous. Flowers subsessile, 22 mm. long; sepals posteriorly connate for 3 mm., elliptic, glabrous, nerved, acute; petals violet, ligulate; stamens and pistil included.

Epiphytic. Ancash: Prov. Cajatambo, near Ocros, 2,400–2,900 meters, *Weberbauer 2736* in part.—Lima: Matucana, 2,700 meters, *403*. Endemic.

60. **Tillandsia ionochroma** André ex Mez in DC. Monogr. 9: 801. 1896. *Caraguata violacea* André, Rev. Hort. 60: 566. 1888, not *Tillandsia violacea* Klotzsch, 1857.

Up to 4 dm. high (extended). Leaves subglabrous, 4–5 dm. long; sheath narrowly ovate; blade ligulate, 25 mm. wide, acute, recurved. Scape slender, glabrous, its bracts leaf-like, imbricate, slightly divergent. Inflorescence bipinnate, thyrsoid, dense above, interrupted below, arching, 25 cm. long, obscurely punctulate-lepidote; primary bracts equaling or exceeding the spikes, bright red when young, the lower ones ovate-lanceolate, acuminate, the upper ones broadly ovate, apiculate. Spikes distichous, subsessile, broadly ovate, 3 cm. long, 4-flowered, complanate, the uppermost ones reduced to a single flower so that the end of the inflorescence appears to be a single polystichous spike. Floral bracts elliptic, obtuse, weakly or not at all carinate, strongly nerved, the lowest distinctly shorter than the sepals. Flowers short-stipitate, 2 cm.

long, the uppermost much smaller and often sterile; sepals oblong, obtuse, 13 mm. long, carinate, strongly nerved; petals ligulate, purple; stamens and pistil included.

Epiphytic. Huánuco: Cani, near Mito, 2,800 meters, *3542.*— Cuzco: Urubamba Valley, 2,300 meters, *Herrera 3497.* Ecuador.

61. **Tillandsia Schimperiana** Wittm. Bot. Jahrb. 11: 67. 1889.

Stemless, stout, 5 dm. or more high. Leaves rosulate, 7 dm. long, sparsely punctulate-lepidote below; sheath large, ovate; blade linear, acuminate at the apex, 4 cm. wide. Scape stout, erect, shorter than the leaves, its bracts densely imbricate, leaf-like, attaining the middle of the inflorescence, the upper red. Inflorescence compact, bipinnate; primary bracts broadly triangular, exceeding the spikes, suberect, acuminate, red. Spikes subsessile, 6–9-flowered, elliptic, acute, compressed, 45 mm. long. Floral bracts imbricate, ovate, apiculate, 22 mm. long, equaling or exceeding the sepals, glabrous, even, chestnut-colored with pale margins, carinate, incurved. Flowers subsessile, 29 mm. long; sepals free, narrowly ovate, obtuse, glabrous, even, strongly carinate; petals white, the blade narrowly ovate, obtuse; stamens included.

Epiphytic. Junín: Prov. Tarma, mountains west of Huacapistana, 2,700–3,000 meters, *Weberbauer 2296.* Colombia.

62. **Tillandsia sphaerocephala** Baker, Journ. Bot. 26: 141. 1888.

Stemless. Leaves densely rosulate, 2–4 dm. long, densely appressed-lepidote, lustrous; sheath large, elliptic, dark brown below, cinereous above and merging imperceptibly into the blade; blade narrowly triangular, 2 cm. broad, involute-subulate toward the apex, erect or decurved. Scape usually curved and ascending, its bracts leaf-like, densely imbricate. Inflorescence bipinnate, densely capitate, 5–6 cm. long; outer primary bracts with a broad ovate base and long, triangular tip which exceeds the inflorescence, the inner primary bracts ovate, obtuse, apiculate, equaling the spikes. Spikes few-flowered, strongly complanate. Floral bracts ovate, 23–30 mm. long, carinate, scantly furfuraceous-lepidote to glabrous, strongly nerved. Flowers subsessile, 2–3 cm. long; sepals ovate, acute, 20–25 mm. long, carinate; petals ligulate, obtuse; stamens about equaling the pistil, shorter than the petals, the filaments straight.

Saxicolous. Cuzco: Valley northeast of Vilcanota, below Caicai, 3,300–3,500 meters, *Pennell 14194.* Urubamba Valley, Caicai, 3,200 meters, *Herrera 1146.* Bolivia. "Ccacca-huiccontoi."

63. **Tillandsia calocephala** Wittm. Med. Rijks Herb. 29: 90. 1916.

Caulescent, 2–3 dm. long. Leaves imbricate along the stem, polystichous, 6–8 cm. long, densely subappressed-lepidote; sheath not distinct; blade narrowly triangular, subulate-acuminate. Scape none. Inflorescence capitate, surrounded by the upper leaves, 25–30 mm. long; primary bracts broadly ovate with subulate apices, much exceeding the spikes. Spikes 2–3-flowered, 15 mm. long; floral bracts ovate-lanceolate, acute, 1 cm. long, slightly shorter than the sepals, carinate, lepidote, scarlet. Flowers 15 mm. long; sepals lanceolate, carinate, glabrous, connate posteriorly for 2 mm.; petals purple, exceeding the stamens.

Saxicolous. Cuzco: Ollantaitambo, 2,850–2,900 meters, *Herrera 290, 860.* Hills of Sacsahuamán, 3,400–3,500 meters, *Herrera 455.* Paucartambo, Hacienda Capana, 3,400 meters, *Herrera 1267.* Bolivia. "Huiccontoi," "ccacca-huiccontoi."

64. **Tillandsia biflora** R. & P. Fl. 3: 41. *pl. 268, f. b.* 1802. *T. violacea* Klotzsch ex Beer, Brom. 266. 1857, nomen. *Anoplophytum violaceum* Beer, Brom. 266. 1857, nomen. *T. tetrantha* R. & P. of Griseb. Goett. Ges. Wiss. Nachr. 1864: 18. 1865. *T. Grisebachiana* Baker, Journ. Bot. 26: 143. 1888.

Stemless, up to 3 dm. high. Leaves utriculate-rosulate, 2 dm. long, obscurely punctulate-lepidote, often purple-mottled; sheath ovate, large; blade ligulate, 2 cm. wide, acute. Scape slender, usually curved, its bracts leaf-like, densely imbricate. Inflorescence densely bipinnate or rarely reduced to a single polystichous spike, ovoid, glabrous or obscurely punctulate-lepidote; primary bracts broadly ovate, thin, inflated, exceeding the lower and middle spikes, the lower acuminate, the upper apiculate. Spikes laxly 1–3-flowered, short-stipitate. Floral bracts broadly ovate, obtuse, much shorter than the sepals, carinate, strongly nerved, membranaceous. Flowers suberect, 2 cm. long; sepals oblong, obtuse, 12–15 mm. long, carinate, nerved; petals ligulate, lavender; stamens and pistil included.

Epiphytic. Huánuco: Near Muña, *Ruiz & Pavón.* Yanano, 2,000 meters, *3658, 3780.*—Junín: Chanchamayo Valley, 1,200 meters, *Schunke 542.* Carpapata, above Huacapistana, 2,700–3,200 meters, *Killip & Smith 24367.* Hacienda Schunke, La Merced, 1,700 meters, *5653.*—Indefinite: Tabina, *Lechler 2132.* Venezuela, Colombia, Ecuador, Bolivia.

65. **Tillandsia fusco-guttata** Mez, Bull. Herb. Boiss. II. 5: 101. 1905.

Stemless, 4 dm. high. Leaves rosulate, subglabrous; sheath large, ovate-elliptic, chestnut; blade linear, 15 mm. broad, acuminate. Scape stout, erect, its bracts imbricate, leaf-like. Inflorescence densely bipinnate, subpyramidal, 6 cm. long; primary bracts ovate-elliptic, long-laminate with recurving tips, exceeding the middle and lower spikes. Spikes densely 6–7-flowered, erect or nearly so, ovate-elliptic, acute, 25 mm. long, compressed. Floral bracts imbricate, 1 cm. long, slightly shorter than the sepals, glabrous, carinate, nerved. Flowers subsessile, 16 mm. long, glabrous; sepals obtuse; petals suberect, blue, obtuse; stamens and pistil included.

Saxicolous. Puno: Near Sandía, 2,200 meters, *Weberbauer 568*. Endemic.

66. **Tillandsia Wangerini** Mez, Repert. Nov. Sp. 3: 40. 1906. *T. pastensis* André of Weberbauer in Engl. & Drude, Veg. Erde 12: 257. 1911, not André.

Stout, over 5 dm. high. Leaves densely utriculate-rosulate, 4 dm. long; sheath large, narrowly elliptic, violet, brown-lepidote; blade triangular-lanceolate. flat, 45 mm. wide. Scape stout, erect, much exceeding the leaves, its bracts densely imbricate, leaf-like, subinflated. Inflorescence bipinnate, densely thyrsoid; primary bracts dull red, broadly ovate-elliptic, exceeding the middle and lower spikes, the lower laminate, the upper apiculate. Spikes rather laxly 6-flowered, sessile, broadly ovate, 3 cm. long. Floral bracts coriaceous, elliptic, obtuse, 13 mm. long, shorter than the sepals, glabrous, the lower strongly carinate. Flowers suberect, glabrous, 19 mm. long; sepals obtuse, coriaceous, striate; petals violet; stamens and pistil included.

Epiphytic. Cajamarca: San Pablo, *Weberbauer 3875*.—Ancash: Prov. Huari, between Pichín and Conín, 3,500–3,600 meters, *Weberbauer 2920*. Endemic.

67. **Tillandsia pulchella** Hook. Exot. Fl. 2: *pl. 154*. 1825. *T. subulata* Vell. Fl. Flum. 133. 1825. *T. pityphylla* Mart. in R. & S. Syst. Veg. 7: 1208. 1830. *T. rosea* Lindl. Bot. Reg. 16: *pl. 1357*. 1830. *Diaphoranthema subulata* Beer, Brom. 155. 1857. *Anoplophytum pulchellum* Beer, Brom. 41. 1857. *T. recurvifolia* Hook. Bot. Mag. 87: *pl. 5246*. 1861. *A. amoenum* E. Morr. Belg. Hort. 33: 265. *pl. 17*. 1883. *A. brachypodium* E. Morr. ex Baker, Brom. 196. 1889. *T. surinamensis* Miq. ex Mez in Mart. Fl. Bras. 3, pt. 3: 603. 1894.

Plant caulescent with stem up to 25 cm. long, often branching and pulvinate, rather variable. Leaves 5–10 cm. long, densely and minutely appressed-lepidote; sheath barely distinct; blade narrowly triangular, subulate-acuminate, 2–7 mm. wide. Scape erect or ascending, short, slender, its bracts imbricate, elliptic, caudate, membranaceous, rose. Inflorescence simple, polystichous-flowered, ovoid, dense, 4–10-flowered. Floral bracts suborbicular, short-caudate or apiculate, much exceeding the sepals, membranaceous, punctulate-lepidote. Flowers erect; sepals lanceolate, acute, glabrous, 1 cm. long, much connate posteriorly; petals blue, white, or rose, 2 cm. long, obtuse; stamens included, the filaments transversely plicate. Capsule cylindric, 15 mm. long.

Epiphytic and saxicolous. Puno: Near Sandía, 2,000–3,200 meters, *Weberbauer 549*. Antilles through Venezuela and Brazil to Bolivia and northern Argentina.

68. **Tillandsia nana** Baker, Brom. 172. 1889.

Caulescent, up to 1 dm. high. Leaves densely imbricate along the stem, polystichous, 6 cm. long, densely subappressed-lepidote, silvery; sheath not distinct; blade narrowly triangular, 6–10 mm. wide, complicate. Scape none. Inflorescence simple, ovoid, 3 cm. long, densely polystichous-flowered. Bracts broad, acute, 16 mm. long, much exceeding the sepals, red. Flowers subsessile, 18 mm. long; sepals lanceolate, acute, connate posteriorly for 2–3 mm., glabrous; petals rose, spreading at the apex; stamens and pistil included.

Saxicolous. Cuzco: Right bank of the Río Urubamba, near Urubamba, 3,200–3,700 meters, *Weberbauer 2554*. Valley of the Río Paucartambo, Hacienda Churu, 3,500 meters, *Herrera 1113a*. —Indefinite: *Gay*. Endemic.

69. **Tillandsia latisepala** L. B. Smith, Proc. Amer. Acad. 68: 148. *pl. 1, f. 6–7*. 1933.

Caulescent, silvery-lepidote. Leaves densely polystichous, densely subpruinose-lepidote; sheath inconspicuous; blade spreading, narrowly triangular, 20–25 cm. long, 17 mm. broad, involute toward the apex. Scape slender, erect, slightly curved, 15 cm. long, its bracts imbricate, elliptic, long-caudate. Inflorescence simple, polystichous-flowered, rather densely ovoid, 6 cm. long. Floral bracts submembranaceous, broadly ovate, exceeding the sepals, the lower caudate, 3 cm. long, exceeding the flowers. Flowers 22 mm. long, subsessile; sepals free, thick-coriaceous, 11 mm. long, 9 mm. wide,

apiculate, densely white-pruinose-lepidote; petals white, narrow, obtuse; filaments transversely plicate near the apex.

Cuzco: Valle de Santa Ana, Huadquiña, 1,500 meters, *Herrera 3313*. Paraguay.

EXCLUDED SPECIES

Tillandsia andicola Gill. Peruvian material referred to this species has proved to be *T. Gilliesii* Baker.

Tillandsia Pavonii Mez. This name is a synonym of *Monotagma laxum* (P. & E.) Schum.

6. VRIESIA Lindl.

Large, showy herbs. Leaves densely rosulate, often banded or mottled, entire. Inflorescence simple or compound, the spikes usually distichous-flowered. Floral bracts conspicuous. Flowers subsessile to pedicellate. Sepals free. Petals free, ligulate, bearing either one or two scales each according to the species, entire. Ovary nearly or quite superior, the style elongate. Ovules many, usually caudate. Seeds fusiform, with a long, straight, basal coma.—About 100 species. Epiphytic, rarely terrestrial. Chiefly Brazilian with outlying species from Mexico and the Antilles to Argentina. Type species, *Vriesia psittacina* Lindl.

Floral bracts chartaceous, 45 mm. long; plant rarely over 4 dm. high ..... 1. *V. heliconioides.*

Floral bracts coriaceous, not over 35 mm. long; plant over 1 m. high.

Floral bracts broadly ovate, twice as long as the sepals, concealing the rachis at anthesis ..... 2. *V. chrysostachys.*

Floral bracts lanceolate, equaling the sepals, not concealing the rachis ..... 3. *V. albiflora.*

1. **Vriesia heliconioides** (HBK.) Hook. ex Walp. Ann. Bot. 3: 623. 1853. *Tillandsia heliconioides* HBK. Nov. Gen. & Sp. 1: 293. 1816. *T. disticha* Willd. ex Schult. f. in R. & S. Syst. Veg. 7: 1226. 1830. *Platystachys disticha* Beer, Brom. 264. 1857. *V. Falkenbergii* Hort. ex Gard. Chron. II. 13: 759. 1880. *V. bellula* Linden, Cat. 109: 7. 1883. *V. disticha* Kuntze, Rev. Gen. 3: 304. 1898 (as to material cited; not as to *Renealmia disticha* L.).

Rarely over 4 dm. high. Leaves 2 dm. long, green above, suffused with red and sometimes spotted below; sheaths distinct, obscurely punctulate-lepidote; blades ligulate, acute or acuminate, subglabrous. Scape erect, usually much shorter than the leaves, its

bracts imbricate, broadly ovate, acute. Inflorescence simple, distichous-flowered, oblong, dense, 6–18-flowered, 2 dm. long, 6 cm. wide, strongly complanate. Floral bracts very broadly ovate and triangular-acute or subrhombic, 45 mm. long and nearly as wide, chartaceous, the base suberect, the middle spreading horizontally and the apex incurved and sharply carinate. Flowers subsessile, 6 cm. long; sepals lanceolate, acuminate, 27 mm. long; petals ligulate, acute, white, bearing 2 obtuse entire scales; stamens included. Capsule 5 cm. long.

Epiphytic, in dense forest. Ayacucho: Río Apurímac Valley, near Kimpitiriki, 400 meters, *Killip & Smith 23013*. Guatemala to Bolivia and southwestern Brazil.

2. **Vriesia chrysostachys** E. Morr. Belg. Hort. 31: 87. 1881. *Tillandsia chrysostachys* Baker, Bot. Mag. 112: *pl. 6906*. 1886. *V. aurea* Hort. ex Baker, Brom. 222. 1889. *V. cryptantha* Hort. ex Baker, Brom. 222. 1889. *T. trinitensis* Baker, Brom. 211. 1889.

Leaves 3–5 dm. long, minutely punctulate-lepidote; blade linear, 4–5 cm. wide, acute. Scape slender, erect, its bracts imbricate, broadly ovate, the lower acuminate, the upper obtuse. Inflorescence of 1–3 spikes. Spikes linear, many-flowered, up to 1 meter long. Floral bracts densely imbricate, broadly ovate, triangular-acute, 35 mm. long, exceeding the flowers, yellow, coriaceous. Flowers subsessile, 25 mm. long; sepals ovate-lanceolate, acute, 15 mm. long; petals yellow; stamens included.

Terrestrial. Junín: East of Quimirí Bridge, La Merced, 700 meters, *Killip & Smith 24010*.—Indefinite: *Davis*. Trinidad.

3. **Vriesia albiflora** Ule, Verh. Bot. Ver. Brandenb. 48: 141. 1907. *Tillandsia rhododactyla* Mez, Repert. Sp. Nov. 16: 76. 1919.

Over 1 meter high. Leaves 6 dm. long, the blade ligulate, 7 cm. wide, flat, rounded-apiculate, subglabrous. Scape erect, stout, its bracts elliptic, acute, imbricate. Inflorescence laxly bipinnate; primary bracts lanceolate, much shorter than the spikes. Spikes suberect, linear, 25 cm. long, 2–3 cm. broad, compressed, prophyllate. Floral bracts lanceolate, 25 mm. long, equaling the sepals, keeled, glabrous, even, imbricate. Flowers erect; sepals narrowly elliptic, acute, coriaceous; petals ligulate, bearing 2 scales 1 cm. from the base, white; stamens and pistil included. Capsule short, equaling the sepals.

Epiphytic. Huánuco: Río Huallaga Canyon below Río Santo Domingo, 1,300 meters, *4265*. Trinidad, Guiana, Amazonian Brazil.

7. GUZMANIA R. & P.

Leaves densely rosulate in the Peruvian species, entire; sheaths usually conspicuous. Inflorescence various; spikes always polystichous-flowered. Flowers perfect. Sepals usually somewhat connate. Petals connate or closely conglutinated, naked, yellow or white. Stamens usually included; filaments more or less fused to the petals. Ovary wholly superior, pyramidal, ellipsoid or ovoid, glabrous. Ovules many, densely glomerate. Capsule septicidal. Seeds with a long, basal, usually brownish coma.—Named in honor of Anastasio Guzmán, Spanish naturalist. Over 80 species. Chiefly Andean with outlying species in southern Central America, the West Indies, Venezuela, Guiana, and the Amazon Basin. Type species, *Guzmania tricolor* R. & P.

Inflorescence simple, spicate or racemose.

Inflorescence cyathiform, corymbose, with conspicuous bracts at base.....1. *G. brachycephala.*

Inflorescence globose to elongate, not corymbose.

Leaves acute or acuminate.

Floral bracts membranaceous.

Young floral bracts glabrous; inflorescence sterile at the apex.....2. *G. monostachia.*

Young floral bracts dark-ferruginous-farinose; inflorescence fertile throughout.....3. *G. calothyrsus.*

Floral bracts coriaceous.

Floral bracts acute.....4. *G. conifera.*

Floral bracts rounded-apiculate.....5. *G. strobilantha.*

Leaves rounded-apiculate.....6. *G. apiculata.*

Inflorescence compound, paniculate.

Floral bracts equaling or exceeding the sepals.

Inflorescence densely capitate.....7. *G. Morreniana.*

Inflorescence elongate.

Spikes dense, strobiliform.

Spikes stipitate, ovoid or obovoid, 4–5 cm. thick.

Leaves and bracts finely and irregularly cross-striate. 8. *G. Lindeni.*

Leaves concolorous; bracts regularly and heavily marked with longitudinal stripes.....9. *G. Killipiana.*

Spikes subsessile, slenderly ellipsoid, not over 2 cm. thick.

Floral bracts enfolding the sepals, 13 mm. long. 10. *G. brevispatha.*

Floral bracts nearly flat, 21 mm. long. 11. *G. tarapotina.*

Spikes lax, elongate. . . . . 12. *G. panniculata.*

Floral bracts much shorter than the sepals.

Primary bracts exceeding the axillary spikes. 13. *G. Weberbaueri.*

Primary bracts much shorter than the axillary spikes. 14. *G. Roezli.*

1. **Guzmania brachycephala** (Baker) Mez in DC. Monogr. 9: 902. 1896. *Tillandsia brachycephala* Baker, Journ. Bot. 26: 40. 1888.

Up to 4 dm. high. Leaves 4 dm. long, tubular-rosulate, erect; sheath narrowly ovate; blade linear, 9 mm. wide, glabrous, acuminate. Scape slender, erect, its bracts imbricate, the lower leaf-like, the upper lanceolate, acuminate. Inflorescence simple, few-flowered, dense, corymbose; subtending bracts 3 cm. long, the interior bracts similar to the exterior, exceeding the sepals, glabrous, lustrous, broadly elliptic, stramineous. Flowers erect, subsessile; sepals all connate for one-third their length, elliptic, obtuse, 12 mm. long, coriaceous. Capsule cylindric, 32 mm. long; coma ferruginous.

Epiphytic. Puno: Near Sangabán, *Lechler 2409.* Endemic.

2. **Guzmania monostachia** (L.) Rusby ex Mez in DC. Monogr. 9: 905. 1896. *Renealmia monostachia* L. Sp. Pl. 287. 1753. *Tillandsia monostachia* L. Sp. Pl. ed. 2. 410. 1762. *T. clavata* Lam. Encycl. 1: 617. 1783. *Pourretia sympaganthera* R. & P. Syst. 1: 82. 1798. *G. tricolor* R. & P. Fl. 3: 38. *pl. 261.* 1802. *G. comosa* R. & S. Syst. Veg. 7: 1232. 1830. *G. sympaganthera* Beer, Brom. 103. 1857. *T. pachycarpa* Baker, Journ. Bot. 25: 238. 1887. *T. gymnophylla* Baker, Journ. Bot. 26: 41. 1888. *G. maculata* Hort. ex Baker, Brom. 152. 1889. *G. grandis* Hort. ex Baker, Brom. 152. 1889. *G. fragrans* Hort. ex Baker, Brom. 152. 1889. *G. clavata* Urban, Repert. Sp. Nov. 15: 99. 1917.

Stemless, 2–4 dm. high. Leaves obscurely punctulate-lepidote, soon glabrous; sheaths broadly ovate, brownish; blades ligulate, 2 cm. wide, acute, yellow-green. Scape erect, its bracts ovate, acute, imbricate, pale green. Inflorescence of a single elongate, polystichous spike, cylindric, 8–15 cm. long, sterile at the apex. Floral bracts imbricate, ovate, acute, membranous, the fertile ones pale green with conspicuous, brown, longitudinal stripes, about equaling the flowers, the sterile ones bright red. Flowers erect, white, 23–29

mm. long; sepals joined equally for about one-fourth their length, 18 mm. long, obovate, broadly obtuse, even, coriaceous; petals fused for most of their length, the lobes elliptic, obtuse; stamens included, the filaments connate with the petals for most of their length. Capsule cylindric, 2–3 cm. long.

Epiphytic and terrestrial. Tumbes: Mountains east of Hacienda Chicama, Prov. Tumbes, 800–900 meters, *Weberbauer 7643*.—San Martín: San Roque, 1,350–1,500 meters, *Williams 7238*.—Huánuco: Near Pillao and Chacahuassi, *Ruiz & Pavón*. Florida, Costa Rica, Panama, Antilles, Venezuela, Colombia, Ecuador, Bolivia.

3. **Guzmania calothyrsus** Mez in DC. Monogr. 9: 910. 1896. *Anoplophytum calothyrsus* Beer, Brom. 263. 1857, nomen. *Tillandsia calothyrsus* Poeppig ex Beer, Brom. 263. 1857, nomen.

Up to 1 meter high. Leaves densely punctulate-lepidote below, 3–6 dm. long; sheath narrowly elliptic, brown-lepidote; blade linear-lanceolate, acuminate, 2 cm. broad, thin. Scape stout, erect, exceeding the leaves, ferruginous-tomentose, its bracts densely imbricate, lanceolate, acuminate, ferruginous-tomentose. Inflorescence simple, polystichous, densely strobiliform, fertile throughout, 6–12 cm. long. Floral bracts imbricate, membranaceous, densely dark-farinose, broadly elliptic, triangular-acute. Flowers subsessile; sepals connate for 6 mm., herbaceous, 22 mm. long, narrowly elliptic, acute, ferruginous-tomentose, soon glabrous; petals narrowly elliptic, obtuse, much connate.

Epiphytic. Huánuco: Near Pampayacu, *Poeppig 1224*.—Junín: La Merced, 1,700 meters, *5346*. Endemic.

4. **Guzmania conifera** André ex Mez in DC. Monogr. 9: 911. 1896. *Caraguata conifera* André, Rev. Hort. 60: 565. 1888.

Nearly 1 meter high. Leaves finely appressed-lepidote, 6–8 dm. long; sheath indistinct, dark-lepidote; blade ligulate, acute, 6–8 cm. wide. Scape stout, erect, its bracts densely imbricate, the lower leaf-like, the upper lanceolate, acuminate, red. Inflorescence simple, polystichous, densely strobiliform, globose or ellipsoid, 11 cm. long. Floral bracts coriaceous, thick, triangular-acute, 4–6 cm. long, red with yellow tips. Flowers sessile, 65–70 mm. long; sepals subtriangular, 25–30 mm. long, glabrous, coriaceous, dark brown with pale margins; petals stramineous, high-connate, obtuse.

Epiphytic and terrestrial. Junín: Hacienda Schunke, La Merced, 1,300 meters, *5615*. Hacienda Schunke, above San Ramón, 1,400–1,700 meters, *Killip & Smith 24872*. Ecuador.

5. **Guzmania strobilantha** (R. & P.) Mez in DC. Monogr. 9: 913. 1896, excl. syn. André. *Bonapartea strobilantha* R. & P. Fl. 3: 39. *pl. 263*. 1802. *Tillandsia strobilantha* Poir. Encycl. Suppl. 5: 309. 1817. *Acanthospora conantha* Spreng. Syst. Veg. 2: 25. 1825. *Misandra strobilantha* Dietr. ex R. & S. Syst. Veg. 7: 1198. 1830, in synon. *Anoplophytum strobilanthum* Beer, Brom. 42. 1857. *T. conantha* Baker, Brom. 228. 1889. *G. parviflora* Ule, Verh. Bot. Ver. Brandenb. 48: 146. 1907.

About 6 dm. high. Leaves brown-punctate-lepidote below, 4–5 dm. long; sheath ovate; blade linear, acuminate, 20–25 mm. broad. Scape slender, erect, its bracts leaf-like, imbricate. Inflorescence simple, polystichous, densely strobilate, globose or ellipsoid, 5 cm. long. Floral bracts broadly elliptic, rounded-apiculate, 15 mm. long, coriaceous, glabrous, striate. Flowers subsessile, 18 mm. long; sepals elliptic, obtuse, 12–15 mm. long, connate for 2 mm.; petals yellowish white, equaling the stamens.

Epiphytic. Loreto: Pampas de Ponasa, 1,000 meters, *Ule 55p.*—Huánuco: Chicoplaya, *Ruiz & Pavón.*—Junín: Pichis Trail, Santa Rosa, 625–900 meters, *Killip & Smith 26199*. Endemic.

6. **Guzmania apiculata** L. B. Smith, Contr. Gray Herb. 98: 25. *pl. 5, f. 8–9*. 1932.

About 5 dm. high. Leaves rosulate, 5 dm. long, obscurely punctulate-lepidote below; sheath ovate, broad; blade linear, 30–35 mm. broad, broadly rounded, apiculate. Scape slender, erect, glabrous, its bracts ovate, apiculate, thin, slightly longer than the internodes. Inflorescence simple, densely strobilate, 8 cm. long, fusiform, sterile toward the apex, glabrous. Floral bracts suborbicular, somewhat broader than long, membranaceous, striate, 2 cm. long, much exceeding the sepals. Flowers short-stipitate; sepals elliptic, broadly acute, equally connate for 3 mm., thin, striate. Capsule 3 cm. long; coma reddish brown.

Epiphytic. Junín: Hacienda Schunke, La Merced, 1,300 meters, *5711*. Endemic.

7. **Guzmania Morreniana** (Linden) Mez in DC. Monogr. 9: 932. 1896. *Massangea Morreniana* Linden in Cat. Expos. Brux. 1880. *Schlumbergera Morreniana* E. Morr. Belg. Hort. 33: 46. *pl. 4–6*. 1883. *Caraguata Schlumbergerii* Baker, Brom. 151. 1889.

Up to 1 meter high. Leaves soon glabrous, 11 dm. long; sheath indistinct, dark brown, punctulate-lepidote; blade linear, acute, 7 cm. wide, green with fine, irregular, dark brown cross-banding.

Scape stout, erect, its bracts densely imbricate, broadly ovate, acuminate, pungent, brownish purple. Inflorescence bipinnate, densely subcapitate or pyramidal, 1 dm. long, dark brown; primary bracts broadly elliptic, acute. Spikes ovoid, erect or nearly so, longer than the primary bracts at maturity. Floral bracts imbricate, coriaceous, broadly ovate, obtuse, 25 mm. long, equaling or exceeding the sepals. Flowers sessile, 4 cm. long; sepals acute, equally connate for 2–3 mm.; petals yellowish, slenderly tubular, obtuse.

Epiphytic. Cuzco: Slopes of Media Naranja, Urubamba Basin, 2,000 meters, *Herrera 2039*. Endemic.

8. **Guzmania Lindeni** (André) Mez in DC. Monogr. 9: 933. 1896. *Massangea Lindeni* André, Ill. Hort. 25: 55. *pl. 309*. 1878. *Schlumbergera Lindeni* E. Morr. Belg. Hort. 33: 121. *pl. 10–12*. 1883. *Caraguata Lindeni* Baker, Brom. 151. 1889.

Several meters high. Leaves subglabrous, 7 dm. long; sheath ovate, densely punctulate-lepidote; blade linear, acute, 7–8 cm. broad, green with fine, irregular, sinuous, dark green or dark red cross lines. Scape stout, erect, 1 meter high, its bracts imbricate, ovate, triangular-acute, green with dark cross lines. Inflorescence bipinnate or at the base tripinnate, elongate, narrow, interrupted; axis green, striate, glabrous; primary bracts broadly triangular or elliptic, acute, cross-lined, shorter than the branches; branches 1 dm. long, bearing 1–few spikes. Spikes densely strobiliform, ovoid or ellipsoid, 6 cm. long. Floral bracts broadly ovate, obtuse, green, equaling the sepals. Flowers sessile, 2 cm. long; sepals elliptic, acute, 13 mm. long; corolla tubular, white, the lobes spreading, acute.

Indefinite: Northern Peru, *Linden*. Endemic.

9. **Guzmania Killipiana** L. B. Smith, Contr. Gray Herb. 98: 29. *pl. 6, f. 1–2*. 1932.

Up to 1 meter high. Leaves 8–9 dm. long, obscurely punctulate-lepidote below; sheath indistinct, brown; blade ligulate, acuminate, 5–7 cm. broad. Scape very stout, erect, glabrous, its bracts imbricate, broadly ovate, acuminate, pungent, yellow-green with longitudinal red stripes. Inflorescence laxly bipinnate; axis stout, angled, glabrous; primary bracts like the scape bracts, all shorter than the spikes or the lower slightly longer. Spikes stout-stipitate for 1 cm., densely strobiliform, ellipsoid or obovoid, 30–40-flowered, 7 cm. long, 4–5 cm. broad. Floral bracts 3 cm. long, much exceeding the sepals, narrowly elliptic, obtuse or apiculate, nearly flat, coriaceous, striate, subglabrous. Flowers subsessile, 38 mm. long; sepals ovate, acumi-

nate, 16 mm. long, nearly free, carinate, coriaceous, punctate; petals white, erect; stamens included.

Terrestrial. Junín: Pichis Trail, Eneñas, 1,600–1,900 meters, *Killip & Smith 25630*. Pichis Trail, Yapas, 1,350–1,600 meters, *Killip & Smith 25561*. Endemic.

10. **Guzmania brevispatha** Mez, Repert. Nov. Sp. 3: 45. 1906.

Up to 1 meter high. Leaves densely rosulate, 3 dm. long, dark-punctulate-lepidote above, covered with a white membrane of scales below; sheath conspicuous, elliptic, brown; blade 2 cm. wide, ligulate, acuminate. Scape erect, slender, its bracts lanceolate, acuminate, the upper lax. Inflorescence bipinnate from 6–8 spikes, lax below, dense at the apex, 16 cm. long; axis glabrous; primary bracts shorter than the spikes, spreading, ovate-triangular, acute, scarlet. Spikes subspreading, ellipsoid, subsessile, 35 mm. long, substrobilate. Floral bracts elliptic, obtuse, glabrous, striate, 13 mm. long, enfolding and exceeding the sepals. Flowers subsessile, glabrous, 2 cm. long; sepals elliptic, obtuse; petals yellow, erect, obtuse; stamens and pistil included.

Terrestrial. Huánuco: Prov. Humalíes, southwestern mountains near Monzón, 2,000–2,500 meters, *Weberbauer 3537*. Endemic.

11. **Guzmania tarapotina** Ule, Verh. Bot. Ver. Brandenb. 48: 147. 1907.

Up to 1 meter high. Leaves 7 dm. long; sheath ovate, dark brown; blade linear, 4 cm. wide, acuminate, glabrous. Scape erect, its bracts leaf-like, imbricate. Inflorescence bipinnate, lax below, 20–35 cm. long, green; primary bracts broadly ovate, acuminate, suberect, shorter than the spikes. Spikes strobiliform, narrowly ellipsoid or subpyramidal, 4–6 cm. long. Floral bracts 21 mm. long, broadly elliptic, exceeding the sepals, obtuse, striate. Flowers 27 mm. long; sepals 18 mm. long, ovate, acute, carinate; corolla narrowly tubular, the lobes ovate; stamens and pistil included.

Epiphytic. Loreto: Chilcayo, near Tarapoto, *Ule 6683*. Mouth of Río Apaga, *Tessmann 4894*.—San Martín: Alto Río Huallaga, 360–900 meters, *Williams 6782*. Endemic.

12. **Guzmania panniculata** Mez, Bull. Herb. Boiss. II. 5: 116. 1905.

Leaves punctulate-lepidote, 85 cm. long; sheath narrow; blade linear, 2 cm. wide. Scape erect, glabrous, its bracts lax, ovate-lanceolate, acuminate, exceeding the internodes. Inflorescence

tripinnate or barely 4-pinnate, lax; primary bracts like the scape bracts, scarlet with yellow tips, all but the lowest shorter than the branches; branches suberect, 1 dm. long. Spikes laxly 7-flowered, 4 cm. long. Floral bracts suberect, broadly ovate, obtuse, 15 mm. long, exceeding and enfolding the sepals, ecarinate, coriaceous, nerved. Flowers sessile, 21 mm. long, glabrous; sepals connate posteriorly for 3 mm., elliptic, acute, ecarinate, coriaceous; petals yellow.

Terrestrial. Puno: Between Tambo Yuncacoya and Tambo Cachicachi on the road from Sandía to Chunchosmayo, 2,000 meters, *Weberbauer 1136*. Ecuador.

13. **Guzmania Weberbaueri** Mez, Bull. Herb. Boiss. II. 5: 114. 1905.

Stout, 1 meter high. Leaves minutely lepidote below, 9 dm. long; sheath narrowly elliptic; blade linear, 6 cm. wide, acuminate. Scape erect, glabrous, its bracts elliptic, acuminate, erect, exceeding the internodes. Inflorescence laxly bipinnate, subcylindric, 3 dm. long; primary bracts broadly ovate, abruptly acuminate, exceeding the spikes, scarlet, coriaceous, glabrous, strongly nerved, suberect. Spikes thick-ellipsoid, obtuse, short-stipitate, densely 5–8-flowered, 25 mm. long. Floral bracts erect or nearly so, broadly elliptic, rounded-emarginate, much shorter than the sepals, coriaceous, glabrous. Flowers yellow, short-pedicellate; sepals 19 mm. long, equally connate for 11 mm., the lobes elliptic, asymmetric, obtuse.

Terrestrial. Puno: Near Tinco on the road from Sandía to Chunchosmayo, 1,200 meters, *Weberbauer 1300*. Ecuador.

14. **Guzmania Roezli** (E. Morr.) Mez in DC. Monogr. 9: 948. 1896. *Schlumbergera Roezli* E. Morr. Belg. Hort. 28: 311. 1878. *Tillandsia rigidula* Baker, Journ. Bot. 26: 44. 1888.

Stemless, 6–10 dm. high. Leaves 4 dm. long; sheath broadly ovate, finely brown-lepidote; blade ligulate, rounded-apiculate, 3–4 cm. broad. Scape slender, erect, exceeding the leaves, glabrous, its bracts ovate, obtuse or apiculate, shorter than the internodes. Inflorescence laxly bipinnate, glabrous; primary bracts like the scape bracts, enfolding the sterile base of the spikes. Spikes spreading, elongate with long sterile prophyllate bases, laxly flowered. Floral bracts green, ovate, narrowly obtuse, shorter than the sepals. Flowers suberect, sessile, 23 mm. long; sepals elliptic, obtuse, 16–18 mm. long, connate for 2 mm.; petals white, recurved-spreading; stamens slightly longer than the petals.

Terrestrial and epiphytic. San Martín: Zepelacio, near Moyobamba, 1,200–1,600 meters, *Klug 3532*. San Roque, 1,350–1,500 meters, *Williams 7236*.—Junín: La Merced, 700 meters, *Killip & Smith 24063*.—Ayacucho: Aina, between Huanta and Río Apurímac, 750–1,000 meters, *Killip & Smith 22686*. Colombia, Guiana.

8. CATOPSIS Griseb.

Stemless herbs. Leaves densely utriculate-rosulate, entire, minutely appressed-lepidote, green; sheath large, ovate. Scape conspicuous. Inflorescence usually bipinnate, rarely simple or tripinnate, its branches polystichous-flowered. Flowers small or minute, sessile or subsessile, perfect in the Peruvian species. Sepals free, usually rounded, asymmetric, glabrous. Petals free, naked. Stamens included, the anthers ovate or elliptic. Ovary superior, broadly ovoid or ellipsoid, the style shorter than the ovary or lacking. Ovules few–several, long-caudate. Capsule septicidal. Seeds with coma apical and folded over, their bases projecting from the capsule.—Greek, a view, the significance not evident. About 20 species. Chiefly in Mexico, Central America, and the Antilles, with outlying species in Florida, northern South America, the Andes, and southern Brazil. Type species, *Catopsis nutans* (Sw.) Griseb.

1. **Catopsis sessiliflora** (R. & P.) Mez in DC. Monogr. 9: 625. 1896. *Tillandsia sessiliflora* R. & P. Fl. 3: 42. *pl. 271, f. b.* 1802. *Tussacia sessiliflora* Beer, Brom. 101. 1857. *Pogospermum sessiliflorum* Brongn. Ann. Sci. Nat. V. 1: 328. 1864.

From 2 to 4 dm. high. Leaves tubular-rosulate, 15 cm. long; blade ligulate, 22 mm. wide, rounded-apiculate. Scape erect, its bracts remote. Inflorescence simple or of only a few spikes; rachis straight; floral bracts shorter than the sepals. Flowers suberect, 1 cm. long; sepals suborbicular, 7.5 mm. long; petals ovate-lanceolate, slightly exceeding the sepals, white; ovary large, ovoid.

Epiphytic. Loreto: Cerro de Escalera, 1,200 meters, *Ule 59p.*—Huánuco: Indefinite, *Ruiz & Pavón*. Mexico and the Antilles to Peru and eastern Brazil.

9. BROMELIA [Plum.] L.

Coarse, terrestrial herbs, spreading by subterranean stolons. Leaves usually rosulate, with large, curved spines along the margin. Inflorescence sessile or stipitate, always compound. Sepals free or somewhat united, obtuse or acute, rarely mucronulate. Petals

rarely with a definite claw, medianly united by the filaments, but their margins free, unappendaged, fleshy in most species. Stamens included, the filaments connate at least below. Anthers narrow, acute. Ovary passing gradually into the thick pedicel, the epigynous tube conspicuous to nearly lacking. Berry succulent, relatively large. Seeds few to many, flattened, naked.—Commemorates Olans Bromel, 1639–1705, physician and botanist in Gothenberg. About 30 species. Mexico and the Antilles to Argentina. Type species, *Bromelia Pinguin* L.

Inflorescence sunk in the leaf rosette, capitate.

Floral bracts exceeding the sepals.....1. *B. Poeppigii.*

Floral bracts shorter than the sepals.....2. *B. tarapotina.*

Inflorescence scapose, laxly paniculate.....3. *B. fastuosa.*

1. **Bromelia Poeppigii** Mez in Mart. Fl. Bras. 3, pt. 3: 188. 1891.

Leaves glabrous; sheaths large, suborbicular, herbaceous-laciniate on the margin; blade narrowly triangular, not at all contracted at the base, pungent, the spines stout, 3 mm. long. Inflorescence capitate, sunk in the center of the leaf rosette; branches 7-flowered, subdistichous; axes brown-farinose; primary bracts like the inner leaves. Floral bracts ovate-lanceolate, equaling the flowers, sparsely dentate, concave-carinate, acute, subglabrous. Flowers 6 cm. long, the pedicels short but distinct, brown-tomentulose; sepals free, narrowly lanceolate, acuminate, 3 cm. long, glabrous except at the base; petals 35 mm. long, glabrous; ovary 25 mm. long, tomentose.

Swampy woods. San Martín: Tocache, *Poeppig 1824.* Endemic.

2. **Bromelia tarapotina** Ule, Verh. Bot. Ver. Brandenb. 48: 130. 1907.

Leaves 1–2 meters long; sheath dark brown, lepidote on both sides; blade narrowly triangular, not contracted at the base, 3–4 cm. wide, the spines 5 mm. long. Inflorescence capitate, sunk in the center of the leaf rosette, brown-tomentose-lepidote, its outer bracts scarlet. Floral bracts linear-lanceolate, serrate toward the apex, shorter than the sepals. Flowers 4–5 cm. long, the pedicel 1 cm. long; sepals free, narrowly triangular, 20–25 mm. long, acuminate, carinate, spinulose-serrate toward the apex; petals white, glabrous, united at the base, 3 cm. long; stamens included.

Dry soil. Loreto: Tarapoto, *Ule 6682.* Endemic.

3. **Bromelia fastuosa** Lindl. Collect. Fasc. 1: *pl. 1.* 1821. *B. antiacantha* Bert. in Virid. Bonon. 4. 1824. *B. Commeliniana* de

Vriese, Del. Sem. Hort. Amst. 1844. *Agallostachys Commeliniana* Beer, Brom. 39. 1857. *A. fastuosa* Beer, Brom. 36. 1857. *A. antiacantha* Beer, Brom. 37. 1857.

Up to 1.5 meters high, very variable. Leaves 1.5 meters long; sheath broad, ferruginous-tomentose; blade narrowly triangular, not at all contracted at the base, 26 mm. broad, coarsely spinose-serrate. Scape stout, white-tomentose, its bracts leaf-like but with glabrous and relatively larger sheaths, the blades bright red. Inflorescence paniculate, narrowly thyrsoid, many-flowered; branches laxly racemose, 7-flowered; axes white-tomentose. Floral bracts subelliptic, obtuse, 6–10 mm. long, tomentulose or subglabrous, white. Flowers 4 cm. long, the lower pedicellate for 1 cm.; sepals free, often spreading, oblong-elliptic, obtuse, 7–15 mm. long; petals violet, 21 mm. long, glabrous; ovary ovoid to subcylindric, densely white-tomentose.

Virgin forest. San Martín: Near Tocache, *Poeppig.* Brazil.

10. GREIGIA Regel

Large herbs, stemless or caulescent. Leaves narrowly triangular, spinose-serrate at the base or throughout. Inflorescence lateral or central and sunk in the leaf rosette, simple, corymbose or capitate. Sepals free or nearly so, symmetric. Petals connate, fleshy, naked. Filaments connate with the petals; anthers narrow, acute; pollen grains large, spherical, unmarked. Ovary glabrous, triangular. Berry fleshy.—Commemorates Major-General Von Greig, Russian horticulturist. Nine or ten species. Costa Rica and Venezuela to Chile. Type species, *Greigia sphacelata* (R. & P.) Regel.

1. **Greigia Macbrideana** L. B. Smith, Contr. Gray Herb. 98: 7. *pl. 1, f. 9–11.* 1932.

Leaves 3–7 dm. long, appressed-white-lepidote below; sheath large, dark brown, densely serrate with spines 3–4 mm. long; blade linear, acuminate, 22 mm. wide, slightly constricted at the base, its spines minute and distant. Inflorescence about 8-flowered, dense; outer bracts dark chestnut throughout, triangular-ovate, acuminate, pungent, densely uncinate-serrate, appressed-lepidote. Floral bracts linear-lanceolate, 35 mm. long, exceeding the sepals, entire, pungent, punctate-lepidote, the lower half stramineous, membranaceous, the upper half dark chestnut, subcoriaceous. Flowers 4 cm. long; sepals resembling the floral bracts, 2 cm. long; corolla

27 mm. long, pink, the tube about as long as the lobes, the lobes erect; stamens and pistil included.

Wet places. Huánuco: Tambo de Vaca, 3,700 meters, *4442*. Endemic.

11. NEOREGELIA L. B. Smith

Regelia Lindm. Öfvers. Akad. Holm. 542. 1890, not Schauer, 1843. *Aregelia* Mez in DC. Monogr. 9: 61. 1896, not Kuntze, 1891.

Leaves densely rosulate, usually spinose-serrate; sheath large; blade acute or rounded-apiculate. Inflorescence simple, densely capitate, cyathiform, sunk in the center of the leaf rosette. Flowers pedicellate; sepals strongly asymmetric with the right side produced into a large wing; petals spreading, acuminate, violet, blue, or white, longer than the stamens and pistil.—Named in honor of Eduard Regel, 1815–1892, German botanist. About 30 species. Species all Brazilian except for one in Guiana and the following one. Type species, *Nidularium Meyendorffii* Regel.

1. **Neoregelia eleutheropetala** (Ule) L. B. Smith, Contr. Gray Herb. 104: 78. 1934. *Nidularium eleutheropetalum* Ule, Verh. Bot. Ver. Brandenb. 48: 131. 1907. *Aregelia eleutheropetala* Mez ex L. B. Smith, Contr. Gray Herb. 98: 5. *pl. 1, f. 4–6*. 1932.

Stoloniferous. Leaves 5–6 dm. long; sheath large, dark brown; blade ligulate, abruptly acute, 6–8 cm. broad, densely serrate with spines 5–7 mm. long. Inflorescence many-flowered; outer bracts elliptic, membranaceous, lepidote. Floral bracts ovate-lanceolate, 4 cm. long, acute, brown-lepidote toward the apex, exceeded by the sepals. Flowers 5–6 cm. long, the pedicel slender, passing imperceptibly into the ovary; sepals free, glabrous, strongly carinate, 21–26 mm. long; petals white.

Epiphytic. Loreto: Yurimaguas, *Ule 6304*. Brazil.

12. STREPTOCALYX Beer

Leaves densely rosulate. Scape very short to elongate. Inflorescence central, 2–3-pinnate, subcapitate to laxly paniculate. Flowers sessile; sepals free or nearly so, strongly asymmetric, with a broad lateral wing; petals free, narrow, naked; stamens and pistil shorter than the petals; pollen grains with 2 or 4 pores; ovary usually farinose, the epigynous tube definite. Berry somewhat fleshy; seeds ellipsoid or ovoid, naked.—Greek, twisted-calyx. Fourteen species, natives of Guiana, northern Brazil, and Peru. Type species, *Streptocalyx Poeppigii* Beer.

Floral bracts entire.

Floral bracts shorter than the ovary.

Floral bracts reniform, apiculate.....1. *S. Poeppigii.*

Floral bracts ovate, acuminate.

Inflorescence cylindric.....2. *S. Williamsii.*

Inflorescence pyramidal.....3. *S. Furstenburgii.*

Floral bracts concealing the ovary.

Primary bracts cucullate.....4. *S. Tessmannii.*

Primary bracts straight.....5. *S. brachystachys.*

Floral bracts serrate.

Sepals serrulate.....6. *S. arenarius.*

Sepals entire.....7. *S. angustifolius.*

1. **Streptocalyx Poeppigii** Beer, Brom. 141. 1857.

Leaves 6–10 dm. long; sheath distinct, dark brown; blade linear, 3–4 cm. wide, acuminate, pale-appressed-lepidote below, the spines 3 mm. long on the outer leaves, 1 mm. long on the inner. Scape slender, arching, tomentulose, its bracts ovate, laciniate-dentate, mucronate. Inflorescence bipinnate, narrowly cylindric, farinose; primary bracts like the scape bracts, broad, pink, concealing the spikes. Spikes distichous-flowered, lax, 2–5-flowered, often sterile at the apex; rachis slender. Floral bracts minute, entire, reniform, apiculate. Flowers 3 cm. long; sepals entire, free, 19 mm. long, mucronate; petals white with blue apices; ovary cylindric.

Terrestrial. Huánuco: Near Cochero, *Poeppig.* Brazil.

2. **Streptocalyx Williamsii** L. B. Smith, Contr. Gray Herb. 98: 14, *pl. 4, f. 7.* 1932.

Leaves 6–7 dm. long; blade linear, acuminate, 3 cm. wide, densely punctulate-lepidote below, the spines 1–2 mm. long. Inflorescence narrowly cylindric, farinose; primary bracts broadly ovate, thin, pink, laciniate-dentate, exceeding the spikes, mucronate. Spikes very laxly 2–5-flowered, sterile at the apex, distichous-flowered; rachis slender, nearly straight. Floral bracts broadly ovate, acuminate, entire, up to 12 mm. long. Flowers 3 cm. long, suberect; sepals free, mucronate, 17 mm. long; petals 26 mm. long, purple when dry.

Forest. Loreto: La Victoria on the Amazon River, *Williams 2722.* Endemic.

3. **Streptocalyx Furstenburgii** (E. Morr. & Wittm.) E. Morr. Belg. Hort. 33: 13. 1883. *Aechmea Furstenburgi* E. Morr. & Wittm. Belg. Hort. 29: 42. *pl. 2.* 1879.

Leaves 5–7.5 dm. long; sheath dark brown; blade acuminate, densely spinose-serrate. Scape very stout, erect, its bracts densely imbricate, broadly ovate, triangular-acute, mucronate, laciniate-dentate, white-lepidote, bright carmine. Inflorescence densely bipinnate, pyramidal, 3 dm. long, white-farinose; primary bracts like the scape bracts, concealing the spikes. Spikes distichously up to 9-flowered. Floral bracts broadly ovate, acuminate, entire, shorter than the ovary. Flowers over 3 cm. long; sepals 15 mm. long without the mucro. Fruiting ovary subglobose, 8 mm. long.

Epiphytic. Junín: Prov. Tarma, valley of the Río Chanchamayo near La Merced, 700 meters, *Weberbauer 1808*. Prov. Jauja, valley of Río Masamerich, *Weberbauer 6664*. Brazil.

4. **Streptocalyx Tessmannii** Harms, Notizbl. Bot. Gart. Berlin 9: 1151. 1927.

Leaves elongate; blade linear, acuminate, 3–4 cm. wide, spinulose. Scape stout, arching, subglabrous, its bracts broadly ovate, long-laminate. Inflorescence densely bipinnate, capitate or pyramidal; primary bracts broadly ovate, red, concealing the spikes, denticulate to entire, the lower acuminate, the upper apiculate and strongly cucullate. Spikes densely 7–10-flowered. Floral bracts ovate or lanceolate, broad, 15–20 mm. long, concealing the ovary and part of the sepals, entire, mucronulate. Sepals lanceolate, entire, 17 mm. long, carinate, mucronate, glabrous; petals 32 mm. long, blue.

Epiphytic. Loreto: Barranquilla on the lower Río Cahuapanas, *Tessmann 3802*. Puerto Arturo, lower Río Huallaga below Yurimaguas, 135 meters, *Killip & Smith 27887*. Mishuyacu, near Iquitos, 100 meters, *Klug 9*. Endemic.

5. **Streptocalyx brachystachys** Harms, Notizbl. Bot. Gart. Berlin 9: 1152. 1927.

Leaves over 6 dm. long; blade linear, at least 2 cm. wide, spinulose. Scape slender, much shorter than the leaves, its bracts ovate-lanceolate, acuminate. Inflorescence densely bipinnate, subcapitate, 6 cm. long; primary bracts ovate, acute, mucronate, concealing the spikes except for the petals, 3–4 cm. long, bright carmine. Spikes few-flowered. Floral bracts broadly ovate, concealing the ovary, mucronate, entire. Sepals broadly lanceolate, 17 mm. long, mucronate, carinate, glabrous; petals 26 mm. long, white with blue apices.

Epiphytic in rain forest. Loreto: Mouth of Río Santiago, *Tessmann 4645*. Endemic.

6. **Streptocalyx arenarius** Ule, Verh. Bot. Ver. Brandenb. 48: 134. 1907.

Leaves 8 dm. long; sheath narrowly ovate, dark; blade linear, acuminate, 15 mm. wide, lepidote below, the spines 2.5 mm. long, retrorse-uncinate. Inflorescence densely bipinnate, ovoid, 18 cm. long, slightly farinose; primary bracts ovate, acute, 8 cm. long, concealing the spikes, mucronate, densely and coarsely spinose-serrate. Spikes distichously 2–6-flowered. Floral bracts broad, more or less 3-parted at the apex with short, obtuse lateral lobes and a triangular-acute middle lobe, 25 mm. long, concealing the ovary but much shorter than the sepals, spinulose-serrate. Flowers 4 cm. long; sepals free, 17 mm. long, mucronate, distinctly serrulate; petals white, 33 mm. long.

Sandy soil in dry woods. San Martín: Juan Guerra, near Tarapoto, *Ule 6335*. Endemic.

7. **Streptocalyx angustifolius** Mez in Mart. Fl. Bras. 3, pt. 3: 283. *pl. 62*. 1892.

Leaves 4–7 dm. long; sheath distinct, dark brown; blade linear, acuminate, 5–10 mm. wide, spinulose-serrate. Scape very short or none. Inflorescence densely bipinnate, subcapitate; primary bracts broad, mostly concealing the spikes, weakly denticulate. Spikes 3–5-flowered. Floral bracts ovate-elliptic, 25 mm. long, concealing the ovary, serrulate. Sepals free, 2 cm. long, acuminate, pungent, entire, wing-keeled; petals 25 mm. long, white.

Epiphytic. Loreto: Pantano, middle Río Blanco, *Tessmann 3133*. La Victoria on the Amazon River, *Williams 2927*. Caballo-cocha on the Amazon River, *Williams 2439*.—San Martín: Alto Río Huallaga, 360–900 meters, *Williams 6656*. Brazil.

13. BILLBERGIA Thunb.

Stemless plants. Leaves rosulate; sheath large; blade linear, spinose-serrate, often banded. Scape erect or arching, its bracts red, membranaceous. Inflorescence simple in the Peruvian species. Flowers showy. Sepals free, erect. Petals free, actinomorphic or slightly zygomorphic, bearing 2 scales, the claw long, the blade narrow, spirally recurving in the Peruvian species. Stamens exserted at anthesis, both series free or the second joined to the petals only as high as the scales. Pollen grains with longitudinal folds but no

pores. Pistil exceeding the stamens, the epigynous tube large. Ovules many, obtuse.—In honor of Gustav Johannes Billberg, Swedish botanist. From 40 to 50 species. Chiefly Brazilian with outlying species in the rest of South America, Mexico, Central America, and Trinidad. Type species, *Billbergia speciosa* Thunb.

Floral bracts scale-like, much shorter than the ovary.

Sepals broad, abruptly acute to rounded-apiculate, not over 12 mm. long.....1. *B. decora.*

Sepals linear-lanceolate, acute or acuminate, 25–40 mm. long.

Inflorescence cylindric; sepals 35–40 mm. long.2. *B. Tessmannii.*

Inflorescence ovoid; sepals 25–28 mm. long....3. *B. formosa.*

Floral bracts all linear-lanceolate, exceeding the ovary. 4. *B. incarnata.*

1. **Billbergia decora** Poepp. & Endl. Nov. Gen. 2: 42. *pl. 157.* 1838. *Helicodea Baraquiniana* Lem. Ill. Hort. 11: *pl. 421.* 1864. *B. boliviensis* Baker, Brom. 81. 1889.

Leaves tubular-rosulate, 5–6 dm. long, finely lepidote, white-mottled; sheath narrowly elliptic; blade ensiform, acute, 55 mm. wide, the spines 1–1.5 mm. long. Scape slender, pendulous, white-farinose, its bracts large, elliptic, acute, bright carmine, aggregated below the inflorescence. Inflorescence spicate, densely white-farinose; rachis straight. Floral bracts squamiform, broadly ovate, 4 mm. long. Flowers sessile, 8 cm. long; sepals asymmetric, unequal, the largest not over 12 mm. long, abruptly acute or rounded-apiculate; petals linear, acute, green; scales basal, dentate; ovary subglobose, 8 mm. long, the epigynous tube short.

Epiphytic. Loreto: Prov. Mainas, near Yurimaguas, *Poeppig 2432.* Yurimaguas, lower Río Huallaga, 135 meters, *Killip & Smith 27646.*—Junín: Pichis Trail, Yapas, 1,350–1,600 meters, *Killip & Smith 25609.* Brazil, Bolivia.

2. **Billbergia Tessmannii** Harms, Notizbl. Bot. Gart. Berlin 10: 177. 1927.

Leaves up to 1 meter long; blade 4–6.5 cm. wide, acuminate, finely spinulose-serrate. Scape elongate, white-farinose, its bracts lance-oblong, acute, 15 cm. long, membranaceous, aggregated below the inflorescence. Inflorescence cylindric, spicate, many-flowered, white-farinose. Floral bracts 2–3 mm. long, almost aborted, deltoid. Flowers sessile; sepals linear-lanceolate, 35–40 mm. long; petals linear; style slender, up to 12 cm. long.

Epiphytic. Loreto: Lower Río Itaya, Soledad, *Tessmann 5318*. Mishuyacu, near Iquitos, 100 meters, *Klug 1324*. Endemic.

3. **Billbergia formosa** Ule, Verh. Bot. Ver. Brandenb. 48: 138. 1907.

Leaves 6 dm. long; sheath narrowly elliptic; blade linear, acuminate, 5 cm. wide, finely spinulose-serrate. Scape arching, slender, its bracts ovate-lanceolate, 1 dm. long, rose, aggregated below the inflorescence. Inflorescence spicate, ovoid, white-farinose. Floral bracts squamiform, acute. Flowers sessile, 9 cm. long; sepals lanceolate, acute, 25–28 mm. long; petals narrow, acuminate, 85 mm. long, yellow-green, violet at the apex.

Epiphytic. Loreto: Iquitos, *Ule 60p*. Endemic.

4. **Billbergia incarnata** (R. & P.) Schult. f. in R. & S. Syst. Veg. 7: 1261. 1830. *Bromelia incarnata* R. & P. Fl. 3: 32. *pl. 255*. 1802. *Billbergia stenopetala* Harms, Notizbl. Bot. Gart. Berlin 9: 1153. 1927.

Leaves 6 dm. long; sheath large, broadly ovate, dark brown; blade 65 mm. wide, concolorous, rounded or acute, coarsely spinose-serrate, the spines black, 5 mm. long. Scape pendulous, brownish-farinose, its upper bracts broadly elliptic, 17 cm. long. Inflorescence simple, laxly spicate, farinose, 3 dm. long, about 30-flowered; rachis straight or nearly so. Floral bracts 9–19 mm. long, exceeding the ovary, acuminate, glabrous. Flowers sessile, spreading, 11 cm. long; sepals triangular, acuminate, 2 cm. long; petals lorate, violet-purple; ovary constricted at the apex, the epigynous tube as long as the ovary and somewhat broader, urceolate.

Epiphytic. Loreto: Río Blanco at the mouth of the Río Capanahua, Río Ucayali drainage, *Tessmann 3060*.—Huánuco: Near Posuso, *Ruiz & Pavón*.—Indefinite: *Ruiz*. Endemic.

14. AECHMEA R. & P.

Large or medium-sized, stemless herbs. Leaves rosulate, usually linear. Scape conspicuous. Inflorescence of various types. Flowers usually sessile. Sepals often asymmetric, usually mucronate. Petals free, bearing 2 scales near the base or high up. Second series of stamens more or less joined to the petals. Pollen grains with 2 or 4 pores. Pistil shorter than the stamens, the stigma lobes linear, often twisted. Ovules caudate or obtuse. Berry usually dry. Seeds small, rugose, dark, naked.—Greek, pointed, referring to the arma-

ment. From 120 to 130 species. Mexico and the Antilles to northern Argentina. Type species, *Aechmea paniculata* R. & P.

Inflorescence compound.

Flowers slenderly pedicellate.....1. *A. ferruginea.*

Flowers sessile.

Rachis deeply excavated opposite the flowers; floral bracts distichous, often imbricate.

Sepals almost wholly exserted at maturity..2. *A. amazonica.*

Sepals mostly concealed by the floral bracts at maturity. 3. *A. Tessmannii.*

Rachis flattened but not truly excavated; floral bracts never imbricate.

Inflorescence with its lower branches sterile, laxly paniculate. 4. *A. paniculata.*

Inflorescence fertile throughout.

Floral bracts forming a tubular sheath about the base of the flower.....5. *A. Mertensii.*

Floral bracts boat-shaped, not forming a sheath about the base of the flower.

Flowers erect; sepals unarmed.....6. *A. Schultesiana.*

Flowers spreading; sepals mucronate..7. *A. angustifolia.*

Inflorescence simple, spicate.

Floral bracts entire, erect; inflorescence cylindric.

Floral bracts exceeding the ovary; leaf blade constricted at the base.....8. *A. contracta.*

Floral bracts minute or wanting; leaf blade not contracted at the base.....9. *A. nudicaulis.*

Floral bracts serrate, reflexed at the apex; inflorescence stout, strobilate.....10. *A. Veitchii.*

1. **Aechmea ferruginea** L. B. Smith, Contr. Gray Herb. 98: 5. *pl. 1, f. 1–3.* 1932.

Leaves 6–7 dm. long, punctulate-lepidote below; sheath large, dark brown; blade linear, 3 cm. wide, spinulose-serrate, the spines 1–2 mm. long. Scape slender, erect, much shorter than the leaves, its bracts lanceolate, acuminate, about equaling the internodes, membranaceous. Inflorescence paniculate, tripinnate, pyramidal, 17 cm. long, lax below, dense above, stellate-ferruginous-lepidote; primary bracts like the scape bracts, all but the lowest shorter than

the branches. Branches laxly flowered, suberect to spreading. Floral bracts minute, acicular. Flowers slenderly pedicellate, 2 cm. long, the pedicels up to 8 mm. long; sepals 4 mm. long, unarmed, red, strongly asymmetric with the right side produced into a thin wing larger than the central portion; petals white with pinkish blue apices, 13 mm. long, the scales basal; ovules obtuse, borne at the summit of the cell.

Terrestrial in dense forest. Junín: Pichis Trail, Dos de Mayo, 1,700–1,900 meters, *Killip & Smith 25815*. Endemic.

2. **Aechmea amazonica** Ule, Verh. Bot. Ver. Brandenb. 48: 136. 1907.

Up to 1 meter high. Leaves 4–10 dm. long, densely punctulate-lepidote; sheath large, castaneous; blade linear, 6–9 cm. broad, spinose-serrate, abruptly acute or rounded-apiculate, often with conspicuous white cross bands below. Scape erect, white-flocculose, its bracts lanceolate, acuminate, remotely denticulate, bright carmine, the lower remote and erect, the upper denser and spreading. Inflorescence bipinnate; lower primary bracts like the scape bracts, 6–12 cm. long, exceeding the spikes, the upper primary bracts abruptly much shorter than the lower, closely resembling the floral bracts in size and form. Spikes long-stipitate, distichous-flowered, linear-lanceolate, densely 12-flowered; rachis geniculate, excavated opposite the flowers. Floral bracts broadly ovate, subtruncate, 10–13 mm. long, barely exceeding the mature ovary, striate, lepidote. Flowers sessile, up to 32 mm. long; sepals asymmetric, 10–12 mm. long, unarmed; petals 2 cm. long, orange, obtuse; ovary glabrous, the ovules long-caudate, borne at the top of the cell.

Epiphytic. Loreto: Caballo-cocha on the Amazon River, *Williams 2220*. Mishuyacu, near Iquitos, 100 meters, *Klug 349*.— San Martín: Tarapoto, 750 meters, *Ule 6315; Williams 5913, 6124*. Endemic.

3. **Aechmea Tessmannii** Harms, Notizbl. Bot. Gart. Berlin 9: 1153. 1927.

One meter or more high. Leaves 5–7 dm. long; blade linear, 6–10 cm. wide, acute, spinose-serrate, appressed-white-lepidote, the spines 3–5 mm. long. Scape stout, erect, its bracts lanceolate, acuminate, spinulose-serrate, bright red. Inflorescence amply bipinnate; primary bracts like the scape bracts, 6–15 cm. long, diminishing evenly in size toward the apex of the inflorescence, the lowest about equaling the spikes. Spikes long-stipitate, spreading,

distichous-flowered, oblong, 8–15 cm. long, densely 12–20-flowered, glabrous. Floral bracts ovate, obtuse, lustrous, 15–25 mm. long, nearly equaling the sepals, green tipped with orange. Flowers sessile; sepals obovate-oblong, obtuse, 13 mm. long, glabrous; petals orange, acute, 6–7 mm. longer than the petals.

Epiphytic. Loreto: Valley of the upper Río Marañón, *Tessmann 3937*. Mishuyacu, near Iquitos, 100 meters, *Klug 1002*. Río Marañón valley, 150 meters, *Killip & Smith 29185*. Lower Río Huallaga, 135 meters, *Killip & Smith 29275*. Endemic.

4. **Aechmea paniculata** R. & P. Syst. 83. 1798.

Leaves over 3 dm. long; blade acuminate, 37–50 mm. wide, whitish below, densely spinose-serrate, the spines 4–6 mm. long. Scape stout, erect, lateral. Inflorescence ample, laxly 4-pinnate, its lower branches sterile with setiform bracts; primary bracts large, lanceolate, exceeding the lowest branches. Spikes spreading, laxly 2–4-flowered, 5 cm. long; rachis geniculate, glabrous. Floral bracts symmetric, suborbicular, 15 mm. broad, with a mucro 8 mm. long, striate. Flowers sessile, nearly 4 cm. long; sepals free, asymmetric, with a large lateral wing, 9 mm. long, glabrous, twisted; petals yellow-green, 27 mm. long, their scales basal, coarsely dentate. Berry 1 cm. long.

Epiphytic. Huánuco: Near Posuso, *Ruiz & Pavón*. Endemic.

5. **Aechmea Mertensii** (Meyer) Schult. f. in R. & S. Syst. Veg. 7: 1272. 1830. *Bromelia Mertensii* Meyer, Fl. Esseq. 144. 1818. *A. spicata* Mart. in R. & S. Syst. Veg. 7: 1273. 1830. *A. mucroniflora* Hook. Bot. Mag. 81: *pl. 4832*. 1855.

Leaves laxly rosulate, up to 4 dm. long, densely appressed-lepidote; sheath narrowly ovate; blade linear, acute, spinulose-serrate. Scape slender, erect, its bracts large, lanceolate, bright carmine, serrulate, the lower lax and erect, the upper spreading and crowded at the base of the inflorescence. Inflorescence bipinnate, fertile throughout, narrowly thyrsoid, acute. Spikes 2–8-flowered, spreading. Floral bracts broadly ovate, mucronate, entire, enfolding the flowers, 5 mm. long, tomentulose. Flowers sessile, 13 mm. long; sepals free, mucronate, strongly asymmetric, 4 mm. long; petals yellow, mucronate; ovary constricted at the apex, the ovules long-caudate, borne near the top of the cell.

Epiphytic. Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 575*. Iquitos, 100 meters, *Killip & Smith 26964, 27203*. Between Yurimaguas and Balsapuerto, 135–150 meters, *Killip & Smith*

28267. Santa Rosa, lower Río Huallaga below Yurimaguas, 135 meters, *Killip & Smith 28949*. Alto Río Itaya, 145 meters, *Williams 3263*. Río Mazán near Iquitos, 125 meters, *Williams 8151*. La Victoria on the Amazon River, *Williams 2793*. Caballo-cocha on the Amazon River, *Williams 2350, 2464*. Trinidad, Venezuela, Guiana, Amazon Basin.

6. **Aechmea Schultesiana** Mez in Mart. Fl. Bras. 3, pt. 3: 334. 1892. *Billbergia paniculata* Mart. in R. & S. Syst. Veg. 7: 1268. 1830, not *Aechmea paniculata* R. & P. 1798. *A. Friedrichsthalii* Mez & Donn. Smith, Bot. Gaz. 19: 263. 1894. *A. inermis* Mez, Bull. Herb. Boiss. II. 4: 620. 1904.

Leaves 5–7 dm. long; sheath ovate, brown-lepidote; blade 2–4 cm. wide, minutely serrate, appearing entire, subglabrous. Scape erect, its bracts elliptic, acute, glabrous, entire, the lower ones shorter than the internodes. Inflorescence densely paniculate, ellipsoid, 7–15 cm. long; primary bracts broadly lanceolate, scarlet, about equaling the branches; branches suberect to spreading, simple or the lowest divided, distichously 6–10-flowered. Floral bracts ovate, acute, short-mucronate, entire, convex, 2–5 mm. long, about equaling the ovary. Flowers sessile, 13 mm. long; sepals free, unarmed, obtuse, 6 mm. long, asymmetric; petals orange, mucronulate; ovary glabrous, the ovules caudate, borne high in the cell.

Epiphytic. Loreto or Amazonas: Mouth of the Río Santiago, *Tessmann 4287*.—Puno: Prov. Sandía, near Chunchosmayo, 900 meters, *Weberbauer 1183*. Costa Rica, Venezuela, Amazonia.

7. **Aechmea angustifolia** Poepp. & Endl. Nov. Gen. & Sp. 2: 43. *pl. 159*. 1838. *Hoplophytum angustifolium* Beer, Brom. 132. 1857. *A. Cumingii* Baker, Journ. Bot. 17: 227. 1879. *A. boliviana* Rusby, Bull. N. Y. Bot. Gard. 4: 456. 1907. *A. cylindrica* Mez, Repert. Sp. Nov. 12: 413. 1913.

Leaves 5–6 dm. long; sheath elliptic, 1 dm. long, light tan; blade linear, acuminate, 3–5 cm. wide, appressed-cinereous-lepidote, spinose-serrate, concolorous. Scape stout, erect, subglabrous, its bracts elliptic, acute, denticulate, red. Inflorescence densely bipinnate, cylindric, fertile throughout, 3 dm. long; axes puberulent; primary bracts like the scape bracts, exceeding the lowest spikes. Spikes spreading or reflexed, distichously 10-flowered, 35 mm. long; rachis undulate, compressed. Floral bracts broadly ovate with a straight mucro, convex, puberulent, 5 mm. long. Flowers sessile, 12–16 mm. long; sepals free, mucronate, asymmetric, subglabrous;

petals yellow, mucronate, the scales borne well above the base; ovary ellipsoid; ovules caudate, borne at the summit of the cell.

Epiphytic. Loreto: Yurimaguas on the lower Río Huallaga, 155–180 meters, *Williams 7817.*—San Martín: Near Tocache, *Poeppig 1823.* Lamas, 840 meters, *Williams 6384.* San Roque, 1,350–1,500 meters, *Williams 7316.*—Huánuco: Monzón region, *Weberbauer 3625.*—Madre de Dios (?): Seringal Auristella, *Ule 9164.* Costa Rica, Panama, Colombia, Brazil, Bolivia.

8. **Aechmea contracta** (Mart.) Baker, Journ. Bot. 17: 234. 1879. *Billbergia contracta* Mart. in R. & S. Syst. Veg. 7: 1263. 1830.

Leaves 5–10, subfasciculate, 4–6 dm. long, distinctly petiolate; sheath broadly ovate; petiole up to 12 cm. long, grooved, spinose-serrate; blade narrowly lanceolate, acuminate, 35 mm. broad, serrate, sparsely lepidote. Scape very slender, more or less arching, white-floccose, its bracts lanceolate, acuminate, aggregated below the inflorescence, bright red. Inflorescence narrowly cylindric, spicate, subdistichous. Floral bracts ovate, acute. Flowers sessile, 35 mm. long; sepals free, 8 mm. long, strongly asymmetric, apiculate; petals 26 mm. long, yellow; ovary tomentose, cylindric; ovules long-caudate, borne high in the cell.

Loreto: Valley of the Río Marañón, *Tessmann 3711.* Lower Río Nanay, *Williams 633.* Mishuyacu near Iquitos, 100 meters, *Klug 1140.* Chimbote, Solimões, *J. G. Kuhlmann 1594.* Brazil.

9. **Aechmea nudicaulis** (L.) Griseb., Fl. West Ind. 593. 1864. *Bromelia nudicaulis* L. Sp. Pl. 286. 1753. *B. lutea* Meyer, Fl. Esseq. 145. 1818. *Tillandsia unispicata* Vell. Fl. Flum. 132. 1825. *Billbergia nudicaulis* Lindl. Bot. Reg. 13: sub. *pl. 1068.* 1827. *B. oblonga* Mart. in R. & S. Syst. Veg. 7: 1256. 1830. *B. lutea* R. & S. Syst. Veg. 7: 1258. 1830. *Pothuava spicata* Gaud. Atl. Bonite *pl. 117.* 1847. *Hoplophytum nudicaule* C. Koch, Ind. Sem. Hort. Berol. App. 6. 1856. *H. unispicatum* Beer, Brom. 138. 1857. *H. languinosum* Beer, Brom. 138. 1857. *Billbergia lanuginosa* Hort. ex Beer, Brom. 138. 1857. *Hoplophytum spicatum* Beer, Brom. 140. 1857. *Hohenbergia nudicaulis* Baker in Saund. Ref. Bot. 4: sub *pl. 284.* 1871. *Pothuava nudicaulis* Regel, Gartenfl. 31: 291. *pl. 1096.* 1882. *Aechmea Cornui* Carr. Rev. Hort. 57: 36. 1885. *Billbergia quadricolor* Hort. ex Baker, Brom. 62. 1889. *Aechmea sulcata* Lindm. Svensk. Akad. Handl. 24: No. 8: 31. *pl. 5, f. 15–21.* 1891.

Leaves 5 dm. long, 6–10 cm. broad above the narrow sheath, linear, apiculate, strongly spinose-serrate. Scape slender, erect or

arching, white-floccose, its bracts erect, elliptic, acute, entire, red, membranaceous, congested at its apex. Inflorescence simple, polystichous, cylindric, fertile throughout. Floral bracts minute or sometimes wanting, entire. Flowers 22 mm. long; sepals free, mucronate, strongly asymmetric; petals 12 mm. long, yellow, acute, bearing fimbriate scales 4 mm. from the base; ovary subglobose, the epigynous tube conspicuous; ovules short-caudate, borne at the middle of the cell.

Epiphytic and terrestrial. San Martín: Salt Mountain near Pilluana on the Río Huallaga, *Ule 6662*. Mexico and the Antilles to southern Brazil.

10. **Aechmea Veitchii** Baker, Bot. Mag. 103: *pl. 6329*. 1877. *Chevalliera Veitchii* E. Morr. Belg. Hort. 28: 177. *pl. 9*. 1878.

Leaves up to 1 meter long; sheath distinct, ovate; blade ensiform, rounded-apiculate, 6 cm. wide, densely white-lepidote below, spinulose-serrate, the spines 1 mm. long. Scape stout, its bracts green, densely imbricate, strict, pungent, densely serrulate. Inflorescence simple, many-flowered, densely strobiliform, up to 5 dm. long, with a coma of sterile bracts at the apex. Floral bracts lanceolate, acuminate, about equaling the mature flowers, densely serrulate, reflexed, bright scarlet, lepidote. Flowers sessile, 3 cm. long; sepals free, subtriangular, acute, glabrous, 14 mm. long; petals erect, white; scales basal; ovary obconic, 7 mm. long, the epigynous tube lacking.

Epiphytic. San Martín: Mountains east of Moyobamba (Weberbauer in Engl. & Drude, Veg. Erde 12: 267. 1911). Colombia.

15. ANANAS Mill.

Leaves densely rosulate, scarcely enlarged at the base, acuminate-pungent, usually spinose-serrate. Scape erect, stout, spiny-bracted. Inflorescence densely strobiliform, crowned with a tuft of sterile, foliaceous bracts. Flowers sessile, violet or red. Sepals free, obtuse, slightly asymmetric. Petals free, erect, each bearing 2 slenderly infundibuliform scales. Stamens included, the pollen grains ellipsoid, with 2 pores. Ovaries coalescing with each other and with the bracts and axis to form a fleshy, compound fruit, the epigynous tube short. Ovules borne near the top of the cell. Berry sterile in the cultivated varieties and forms.—Name Brazilian. A single variable species of which the common cultivated variety is typical taxonomically.

1. **Ananas comosus** (L.) Merrill, Interpret. Rumph. Herb. Amboin. 133. 1917. *Bromelia Ananas* L. Sp. Pl. 285. 1753. *B. comosa* L. in Stickm. Herb. Amboin. 21. 1754. *Ananassa sativa* Lindl. Bot. Reg. 13: sub *pl. 1068*. 1827. *Ananas sativus* Schult. f. in R. & S. Syst. Veg. 7: 1283. 1830. *A. Ananas* Cockerell, Proc. Acad. Phila. 1896: 776. 1896.

Characters of the genus. Wild specimens small, with fruit only slightly fleshy.

Terrestrial, cultivated on the eastern slopes of the Andes up to an elevation of 1,800 meters (*Weberbauer!*). Junín: La Merced, 700 meters, *5482*. Native of Brazil and Guiana, cultivated and becoming an escape elsewhere in tropical America.

26. COMMELINACEAE. Spiderwort Family

Reference: C. B. Clarke in DC. Monogr. 3. 1881.

Although this family is largely tropical, it is not especially well represented in Peru. The genera are annoyingly ill-defined and even the number of fertile stamens is inconstant sometimes. The following key, based on Brückner's careful synopsis, Pflanzenfam. ed. 2. 15a. 1930, is supplemented by another that leads one to most or all of the more conspicuous plants.

Rhoeo discolor (L'Hér.) Hance, probably native of Mexico, is grown sometimes in gardens. It has rather showy flowers and elongate strap-shaped leaves which usually are deep purple beneath. The name "flor de piña" is given to it at Iquitos.

Fertile stamens normally 5 or 6.

Petals free or nearly free.

Petals equal, the flowers regular, umbellate or fasciculate.

Peduncles perforating the leaf sheaths.....1. *Campelia.*

Peduncles exserted from the leaf sheaths....2. *Tradescantia.*

Petals unequal, the flowers irregular or racemose-paniculate.

Flowers regular or nearly so.....3. *Dichorisandra.*

Flowers irregular.

Filaments glabrous.....4. *Floscopa.*

Filaments, or some of them, hairy.

Flowers fasciculate-umbellate.....10. *Geogenanthus.*

Flowers racemose.....5. *Tinantia.*

Petals connate into a long slender tube.....11. *Zebrina.*

Fertile stamens 3 or rarely 6.
Flowers irregular, in spathe-bracted racemes or cymes.
Capsule dehiscent....6. *Commelina.*
Capsule indehiscent....7. *Athyrocarpus.*
Flowers regular, minute, axillary-congested or in open terminal panicles or umbels.
Flowers axillary-congested or in terminal umbels.8. *Callisia.*
Flowers in open terminal panicles....9. *Aneilema.*

SUPPLEMENTARY KEY

Flowers enclosed in or subtended by a spathe or spathe-like structure.
Peduncles exserted from the leaf sheaths, often lacking or short.
Flowers neither minute nor congested-axillary.
Flowers more or less obviously umbellate....2. *Tradescantia.*
Flowers not umbellate.
Flowers tubular, the tube exserted from the bracts. 11. *Zebrina.*
Petals free or nearly so.
Capsule dehiscent; plants glabrous or somewhat pubescent....6. *Commelina.*
Capsule indehiscent; stems laterally or sheaths conspicuously hairy....7. *Athyrocarpus.*
Flowers minute, congested-axillary or rarely umbellate. 8. *Callisia.*
Peduncels perforating the leaf sheaths, greatly elongate. 1. *Campelia.*
Flowers not closely enclosed in bracts.
Flowers umbellate or fasciculate-umbellate-racemose, terminal.
Pedicels 2 cm. long or longer....10. *Geogenanthus.*
Pedicels 1 cm. long or shorter.
Flowers umbellate, small....2. *Tradescantia.*
Flowers racemose-umbellate, about 1 cm. long..5. *Tinantia.*
Flowers paniculate-racemose or at least not fasciculate-umbellate unless lateral.
Flowers tiny, inconspicuous.
Pedicels glabrous, several mm. long....9. *Aneilema.*
Pedicels often hairy, very short....4. *Floscopa.*

Flowers rather conspicuous.

Flowers borne in lateral, peduncled or subsessile fascicles. 10. *Geogenanthus.*

Flowers borne in terminal racemes or panicles. 3. *Dichorisandra.*

1. CAMPELIA L. C. Rich.

A stout herb with large leaves and long axillary peduncles bearing a number of small, nearly regular, fascicled, white flowers. Stamens subequal. Filaments bearded. Anther connective oblong-triangular. Capsule 2–3-celled, each cell 1–2-seeded.

Campelia Zanonia (L.) HBK. Nov. Gen. & Sp. 1: 264. 1816; 314. *Commelina Zanonia* L. Sp. Pl. 41. 1753.

Sometimes 1 meter high and the leaves 2 dm. long and 5 cm. wide; inflorescence bracts 2–5 cm. long; bractlets many; petals and sepals subequal.—The only species, typically more or less pilose-villous; in the var. *glabrata* (Kunth) Clarke the leaves are glabrous and the petals exceed the sepals.—Illustrated, Kerner, Pflanzenleben ed. 3, pt. 1: 163.

Ayacucho: Estrella, 500 meters, *Killip & Smith 23081.* Near Kimpitiriki, 400 meters, *Killip & Smith 22882.*—Huánuco: Below Muña, 1,200 meters, *4204.* Posuso, 600 meters, *4661* (both det. Brückner).—Junín: La Merced, 600 meters, *5370* (det. Brückner). Chanchamayo Valley, 1,200 meters, *Schunke 470.* Above San Ramón, *Killip & Smith 24719.* La Merced, *Killip & Smith 23733.* Yapas, *Killip & Smith 25470.*—Loreto: Yurimaguas, 135 meters, *Killip & Smith 27613.* Pampas del Sacramento (*Huber 1505*). Río Acre, *Ule 9156.*—San Martín: Tarapoto, *Ule 6331.* Alto Río Huallaga, *Williams 5749, 5648.* Río Mayo, *Williams 6195.* San Roque, *Williams 7723.* Widely distributed in tropical America.

2. TRADESCANTIA L.

Herbs, usually more or less procumbent, with small or medium-sized leaves and regular, blue, roseate, or white flowers borne in sessile or pedunculate umbels. Stamens 6 or rarely only 3, the filaments equal or 3 a trifle to much shorter, the anthers all alike or more or less dissimilar. Capsule 3-celled, the cells usually 2-ovuled.—Brückner has recently taken up *Descantaria* Schlecht. on the basis of its dissimilar anthers. There is a practical loss rather than gain in this purely academic action.

Leaves mostly about 1–1.5 cm. wide.
Leaves glabrous, at least beneath; anthers similar.
Bracts small; flowers white; plants not fleshy.
Filaments glabrous; leaves drying subdiaphanous. *T. cordifolia.*
Filaments hairy; leaves firm, opaque..... *T. gracilis.*
Bracts foliaceous; flowers rose; plants fleshy..... *T. navicularis.*
Leaves pilose, at least beneath; anthers dissimilar or the connective elongate-arcuate.
Leaves pilose on both sides..... *T. ionantha.*
Leaves pilose only beneath.
Leaves mostly 2.5–3 cm. long..... *T. parviflora.*
Leaves rarely 2.5 cm. long..... *T. gracilis.*
Leaves mostly 2–3 cm. wide.
Leaves lanceolate (typically), about 2 cm. wide; petals 4–6 mm. long.
Flowers well exserted or ebracteate.
Pedicels not capillary nor the sheaths conspicuously villous.
Leaves more or less pubescent; peduncle longer than the subtending leaf..... *T. elongata.*
Leaves glabrous; peduncles shorter than the subtending leaf..... *T. cumanensis.*
Peduncles and pedicels capillary; sheaths villous. *T. geniculata.*
Flowers nearly concealed in the conspicuous bracts. *T. cymbispatha.*
Leaves cordate-ovate or broadly lanceolate, 2–3 cm. wide; petals 8–9 mm. long.
Bracts small.
Coarse plants with several axillary flower clusters. *T. ambigua.*
Slender plants, the flowers terminal..... *T. encolea.*
Bracts conspicuous..... *T. cymbispatha.*

Tradescantia ambigua Mart. ex R. & S. Syst. Veg. 7: 1170. 1830.

A stout, leafy, somewhat pubescent plant with several to many axillary umbels of showy purple flowers; leaves often 1 dm. long and

3–4 cm. broad, ashy-pubescent beneath; filaments nearly glabrous; seeds 2 mm. long, rugose.

Huancavelica: Below Surcubamba, 1,500 meters, *Weberbauer 6495* (det. Brückner). Brazil and Bolivia.

Tradescantia cordifolia Sw. Fl. Ind. Occ. 1: 601. 1797; 300.

Nearly glabrous; leaves subcordate, 2 cm. long and 1 cm. wide; peduncles 4–8-flowered; pedicels and sepals (2 mm. long) pubescent; petals white; capsule 1.5 mm. long.—A delicate plant with flaccid stems and leaves.

San Martin: Tarapoto (*Spruce*); *Ule 6610*. North to Mexico and the West Indies.

Tradescantia cumanensis Kunth, Enum. 4: 96. 1843; 306. *Descantaria cumanensis* Brückn. Pflanzenfam. ed. 2. 15a: 171. 1930.

Glabrous except for the sheaths and the usually glandular-pilose inflorescence; leaves 7–8 cm. long; stamens unequal, the 3 shorter glabrous, their anthers dissimilar.—*T. multiflora* (see under *T. parviflora*) has shorter leaves. These species and *T. elongata* are often scarcely distinct, and probably there is really one species with merging variations. Neg. 10739.

Amazonas: Chachapoyas, *Mathews 3117*. North to Central America.

Tradescantia cymbispatha Clarke in DC. Monogr. 3: 296. 1881.

Leaves broadly lanceolate, shortly petioled at the oblique base, about 1 dm. long, 3 cm. wide, sparsely pilose beneath, or those of the sterile branches smaller and pilose on both sides; umbels conspicuously 2-bracted, the bracts to 2 cm. long; sepals 5 mm. long; stamens unequal, the longer bearded, the shorter scarcely so, the anthers nearly similar.—Flowers white.

Huánuco: Near Mito, *3382, 1617*. Huánuco Mountains, 4,000 meters, *2159*.—Lima: Huariaca, *3122* (all det. Brückner). Bolivia.

Tradescantia elongata G. F. W. Mey. Prim. Fl. Esseq. 146. 1818; 303. *Descantaria elongata* Brückn. Pflanzenfam. ed. 2. 15a: 172. 1930.

Leaves about 8 cm. long and 2 cm. wide; peduncles mostly or all terminal, glabrous or hairy on one side; stamens unequal, glabrous or pubescent, the anthers dissimilar.

San Martín: Tarapoto (*Spruce 4071*).—Junín: La Merced, 600 meters, *5338*. Brazil to the West Indies and Mexico.

Tradescantia encolea Diels, Bot. Jahrb. 37: 381. 1906. *Descantaria encolea* Brückn. Pflanzenfam. ed. 2. 15a: 172. 1930.

Stems (1.5–5 dm. long) above and inflorescence fuscous-pilose; sheaths ample, 3–4 cm. long and 7 mm. broad; leaves cordate-ovate, 6–8 cm. long, 2–2.5 cm. wide; peduncles 1.5–2 cm. long; pedicels 5 mm. long; petals 8–9 mm. long, white (?); longer stamens bearded, 5 mm. long.—Allied to *T. cumanensis* HBK. Neg. 10740.

Peru: *Weberbauer 3855* (without locality).—Lima: Matucana, 2,400 meters, *350*.

Tradescantia geniculata Jacq. Select. Stirp. Am. Hist. 94. *pl. 64*. 1763; 300.

Well marked by its geniculate stems, more or less villous laterally, as also the leaves, especially beneath, and the long and slender-peduncled, axillary and terminal umbels of capillary-pediceled flowers; leaves 3–6 cm. long, 1.5–2 cm. wide; sheaths conspicuously villous; flowers greenish white; stamens subequal; ovary glabrous.

San Martín: Tarapoto, *Williams 5506, 6182*.—Junín: Near La Merced, *Killip & Smith* (all det. Brückner). South America; Mexico; West Indies.

Tradescantia gracilis HBK. Nov. Gen. & Sp. 1: 261. *pl. 672*. 1816; 297.

Flaccid-stammed, procumbent and rooting at nodes below; leaves ciliate or glabrous, usually broadly ovate, 1.5–2 cm. long, 1 cm. wide, sometimes larger; peduncles mostly terminal, 1 to several cm. long; pedicels 3–6 mm. long, like the sepals minutely glandular; flowers small, white; anthers similar but the connective narrowly ligulate, arcuate.—The var. *bicolor* (Kunth) Clarke has the leaves pubescent beneath, and this form is scarcely distinguishable from *T. parviflora* except by the similar anthers.

Cajamarca: San Pablo, 2,200 meters, *Weberbauer 3855*.—Without locality (*Mathews*, the var.).—San Martín: San Roque, *Williams 7147* (det. Brückner).—Huánuco: Ambo, *3156*. Ecuador: Colombia.

Tradescantia ionantha Diels, Bot. Jahrb. 37: 382. 1906. *Descantaria ionantha* Brückn. Pflanzenfam. ed. 2. 15a: 172. 1930.

Stems erect above the branched base, 1.5–3.5 dm. high; sheaths 5–8 mm. long, pilose at throat; leaves broadly sessile, ovate, 1.5–4

cm. long, 1–1.5 cm. broad, above sparsely, beneath densely pilose; pilose inflorescence much aggregate in the upper leaf axils and terminal; pedicels about 2 mm. long; petals pale lilac, 3 mm. long; longer stamens bearded, 3 mm. long.—Allied to *T. multiflora* Sw. Neg. 10741.

Puno: Sandía, 2,100 meters, *Weberbauer 588.*

Tradescantia navicularis Ortg. Gartenflora 26: 130. *pl. 901.* 1877; 291.

Fleshy, the short thick ciliate leaves 1–2 cm. long, 1 cm. wide, closely sessile and below often imbricate, above remote, the uppermost subtending the umbel-like inflorescence of showy roseate flowers 5–7 mm. long; pedicels 1–2 cm. long, glabrous; filaments roseate-bearded below.—Cultivated at Dahlem. *T. brachyphylla* Greenm. of Mexico seems to be the same.

Peru: (*Roezl*).

Tradescantia parviflora R. & P. Fl. 3: 43. *pl. 272.* 1802; 306.

Similar in habit to *T. gracilis*, but the leaves oblong-lanceolate or ovate, 2.5–3 cm. long, 8–15 mm. broad, densely short-pilose beneath; sheaths pilose and long-ciliate; peduncles to 1 cm. long, minutely glandular-pubescent as also the short pedicels and sepals; flowers white, tiny; stamens dissimilar, 3 larger.—*T. multiflora* Sw., similar and to be expected, is a stout plant, the leaves usually glabrous, ovate, about 2 cm. broad and 3–4 cm. long, the flowers typically larger and rose.

San Martín: Tarapoto, *Spruce 4190, 4198.*—Huánuco: Posuso and Huánuco (*Ruiz & Pavón*).

3. DICHORISANDRA Mikan

Stout perennials with large leaves and terminal racemes of blue-violet, nearly regular flowers. Stamens 5 or 6, equal or the outer a little shorter. Filaments short, glabrous. Anthers dehiscent apically by a pore. Capsule 3-celled, the cell 4–5-ovuled, rarely 2–3-ovuled. —The species are not well marked, and it is probable that they are fewer and variable. The generic name is conserved.

Sepals pubescent; flowers racemose-paniculate.

Leaves glabrate or finely pubescent beneath.....*D. hexandra.*

Leaves yellowish-villous beneath.....*D. villosula.*

Sepals glabrous; flowers often merely racemose.

Petioles and sheaths 2–3 mm. broad.

Sheaths sparsely long-ciliate; petals and sepals subequal. *D. inaequalis.*

Sheaths densely ciliate; petals exceeding the sepals. . *D. hexandra.*

Petioles and sheaths 4–8 mm. broad. . . . . *D. Ulei.*

Dichorisandra hexandra (Aubl.) Standl. in Standl. & Calderón, Lista Pl. Salvad. 48. 1925. *Commelina hexandra* Aubl. Pl. Guian. 1: 35. *pl. 12.* 1775. *D. Aubletiana* R. & S. Syst. Veg. 7: 1181. 1830.

Plants 1–2 meters high; leaves about 6 cm. long and 2.5 cm. wide, acuminate, unequally and broadly cuneate or subrotund at base, typically not at all transversely striate; petioles 1–2 mm. broad; sheaths more or less villous; panicle usually equaling or exceeding the leaves; sepals puberulent, 6 mm. long; petals subrotund, obtusish. —The Peruvian plant, perhaps specifically distinct, is var. *persicariaefolia* (Clarke) Macbr. (*D. Aubletiana* R. & S. var. *persicariaefolia* Clarke in DC. Monogr. 3: 274. 1881), with transversely striate leaves.

Junín: La Merced, *5593* (det. Brückner). Puerto Yessup, 400 meters, *Killip & Smith 26391.*—Loreto: La Victoria, *Williams 2828, 2751, 3109, 3111.* Caballo-cocha, *Williams 2326.* Leticia, *Williams 3064.* Pebas, *Williams 1625.* Río Itaya, *Williams 145, 3480, 47, 165.* Iquitos, *Williams 8181, 8195, 1424, 7943, 1439, 1539, 3532; Killip & Smith 27405, 27246, 27114, 27106.* Mishuyacu, *Klug 369.* Lower Río Nanay, *Williams 603, 381.* Yurimaguas, *Williams 4433.* San Antonio, *Killip & Smith 29359.*—San Martín: Moyobamba, *Weberbauer 4624.* Tarapoto (*Spruce 4497*); *Williams 6034, 6061, 6395, 6474.* San Roque, *Williams 6948, 7355.*—Puno: Sandía region, *Raimondi* (det. Brückner). Widely distributed in tropical America. "Puchu-yuiyui," "tambisí."

Dichorisandra inaequalis Presl, Rel. Haenk. 1: 140. 1827; 278.

Apparently similar to *D. hexandra*; leaves often shorter, unequally subrotund at base, sometimes sparsely pubescent beneath; racemes elongate, yellowish-pubescent; sepals 9 mm. long; petals ovate.—Perhaps the same as the variety of *D. hexandra.*

Huánuco: (*Haenke*).—Puno: Sangabán (*Lechler 2506*). Brazil.

Dichorisandra Ulei Macbr. Field. Mus. Bot. 11: 8. 1931. *D. longifolia* Ule, Verh. Bot. Ver. Brandenb. 50: 71. 1908, not Mart. & Gal., 1842.

Ascending-erect, 1–3 meters high, glabrous or nearly so except for the apex of the sheaths and the short inflorescence; leaves oblong-

lanceolate, long-acuminate, 1.5–2 dm. long, 3.5–4 cm. wide, constricted at base to a very short petiole 4–5 mm. broad; petals bright blue, acutish, longer than the glabrous sepals.—Distinguished by Ule from *D. ovata* Mart. by the longer and glabrous leaves. Perhaps not distinct from *D. thyrsiflora*, with leaves gradually narrowed to the petiole, a subpaniculate inflorescence, and obtuse petals, but the elongate leaves of this plant are nearly oblong. *D. densiflora* Ule, similar, is distinguishable by its ample inflorescence and elliptic leaves. Neg. 10751.

Loreto: Cerro de Ponasa, 1,200 meters, *Ule 6669*.

Dichorisandra villosula Mart. ex R. & S. Syst. Veg. 7: 1185. 1830; 276.

Except in pubescence very much like *D. hexandra;* panicle typically 3–4 cm. long; sepals pilose, 8 mm. long.—The Peruvian plant is sometimes the var. *evolutior* Clarke, with leaves to 5.5 cm. broad, panicles to 12 cm. long, and fulvous-villous sepals 11 mm. long. Petals rich blue or purple, the fruit orange-red.

Huánuco: Cochero (*Mathews 31*).—Junín: La Merced, *5707* (det. Brückner). Brazil.

4. FLOSCOPA Lour.

Diffuse herbs with medium to large leaves and small to ample, terminal racemes or panicles of small flowers. Stamens typically all fertile and equal. Filaments glabrous. Anther cells ellipsoid, usually similar. Capsule 2-celled, the cells 1-seeded.

Leaves oblong-lanceolate, 2.5 to rarely 3.5 cm. wide. . *F. peruviana.*

Leaves elliptic-lanceolate, mostly 4–5 cm. wide or wider.

Stems stout; leaves 5–5.5 cm. wide. . . . . *F. robusta.*

Stems slender; leaves 3.5–4.5 cm. wide. . . . . *F. elegans.*

Floscopa peruviana Hassk. ex Clarke in DC. Monogr. 3: 270. 1881.

Stems yellowish-hirsutulous; leaves rarely elliptic, narrowed and somewhat petioled at base, acute, minutely scabrous above, glabrate beneath, to 11 cm. long and 4.5 cm. wide; panicle to 6 dm. wide; upper bracts 5–10 mm. long; seeds whitish, radially striate.—The var. (?) *perforans* Clarke has smaller leaves, a looser smaller panicle, and sometimes the branchlets perforating the sheaths. Plants a few cm. to about 2 dm. high, in small plants the inflorescence only 1 cm. long. Flowers blue or white.

Puno: Sangabán, *Lechler 2467*, type.—Huánuco: Monzón, *Weberbauer 3684*.—Loreto: Iquitos and vicinity, *Williams 8163; Klug 313, 1142*. Caballo-cocha, *Williams 2140, 2360*. Yurimaguas, *Ule 6297*. Pebas, *Williams 1675* (all det. Brückner). San Antonio, *Killip & Smith 29500*.

Floscopa robusta (Seub.) Clarke in DC. Monogr. 3: 271. 1881. *Dithyrocarpus robustus* Seub. in Mart. Fl. Bras. 3, pt. 1: 255. 1855.

Stems fleshy, the large leaves as much as 2 dm. long and 5 cm. wide, crowded above; panicle 5 cm. wide; seeds depressed-conical, transversely rugose.—The Peruvian plant is var. *Sprucei* Clarke, with minutely pubescent leaves and larger, less pubescent panicle, the sepals glabrate.

San Martín: Tarapoto (*Spruce 4427*).—Huánuco: Pampayacu (*Poeppig 1295*).—Junín: La Merced, *5813* (det. Brückner). Weberbauer, 288.—Loreto: Mouth of Río Santiago, *Tessmann 4695* (det. Brückner). Brazil and Colombia.

Floscopa elegans Huber, Bol. Mus. Goeldi 4: 541. 1906.

Stems glabrous, geniculate-ascending, the lower internodes to 1 dm. long and 2–3 mm. thick; sheaths 4–5 mm. broad, 1.5 cm. long, oblique, with a rusty-villous line toward the internode, otherwise glabrous; leaves lanceolate, 10–18 cm. long, acuminate, contracted to a petiole about 1 cm. long, minutely scabrous above, glabrous beneath; panicle to 8 cm. broad, densely hispidulous but eglandular; bracts and bractlets glabrate; flowers white, the sepals densely hirtellous; capsule lustrous, discoid, the seeds whitish, striate.

Loreto: Cerro de Canchahuayo (*Huber*).

5. TINANTIA Scheidw.

Erect herbs with rather large leaves and solitary peduncles bearing 2–3 dense racemes, scarcely umbellate. Stamens 6, or rarely only 3 unequal, the shorter with hairy filaments. Anthers dissimilar. Capsule 3-celled, the cells 3–5-seeded.—The name is conserved.

Tinantia erecta (Jacq.) Schlecht. Linnaea 25: 185. 1852; 286. *Tradescantia erecta* Jacq. Coll. Bot. 4: 113. 1790. *T. latifolia* R. & P. Fl. 3: 44. *pl. 272*. 1802.

Leaves ovate-lanceolate, glabrous beneath, to 7 cm. long and 3 cm. broad; peduncles villous, sometimes glandular; petals blue or purplish 1–1.5 cm. long.

Ayacucho: Carrapa, 2,200 meters, *Killip & Smith 22304*.—Cuzco: Near Chilechile, 2,200 meters, *Weberbauer 7856*.—Huánuco: Muña, 2,100 meters, *3980*. Mito, 2,700 meters, *3378* (both det. Brückner). Weberbauer, 145.—Lima: Chancai and Lurín regions (*Ruiz & Pavón*). Widely distributed in tropical America.

6. COMMELINA [Plumier] L. Dayflower

Rather succulent, branching perennials or annuals with sessile or subsessile leaves and irregular flowers, usually blue, borne in cymes from spathe-like bracts. Two of both the sepals and petals larger than the third; one of the fertile stamens incurved and its anther often larger. Capsule 3-celled, with 3–6 seeds.—Species not well defined and probably they are fewer than here accepted, but variable.

Spathes not connate, or only below; seeds reticulate or rugose-foveolate.

Usually most of the spathes about 3 cm. long (2–4 cm.).

Spathes evidently cross-striate; plants scabrous above.

Plants erect; leaves 3–4 cm. wide.....*C. coelestis.*

Plants erect or diffuse; leaves 1–2 cm. wide.

Leaves mostly less than 1 cm. wide; plants erect. *C. graminifolia.*

Leaves mostly more than 1 cm. wide; plants diffuse. *C. tuberosa.*

Spathes obscurely cross-striate; plants villous to glabrous. *C. fasciculata.*

Usually most of the spathes about 2 cm. long (1.5–2.5 cm.).

Inner sepals definitely connate.....*C. Jamesonii.*

Sepals distinct or nearly so.

Plants pubescent; leaves about 3 cm. wide.....*C. hispida.*

Plants glabrate; leaves about 2 cm. wide.

Capsule 2-celled; seeds usually 4.....*C. communis.*

Capsule 3-celled; seeds usually 5.....*C. longicaulis.*

Spathes more or less united or, if only below, the seeds smooth.

Branches decumbent, rooting; seeds 3, smooth.....*C. elegans.*

Plants erect or subscandent; seeds 5, rough.....*C. monticola.*

Commelina coelestis Willd. Enum. Hort. Berol. 1: 69. 1809; 153.

Erect with strict branches, scabrous above as usually also the leaves and peduncles, these 1–6 cm. long; leaves about 1 dm. long,

3–4 cm. broad, sometimes cordate at base; spathes 2–4 cm. long, the margins free, pubescent; lower racemes 1–2-flowered, the upper 4–10-flowered; sepals free or nearly so; petals 1.5 cm. long; seeds 5, foveolate-rugose.—Roots fibrous or fasciculate-tuberous. Illustrated, Bailey, Encycl. Hort. 835.

Junín: Tarma, 3,000 meters, *Killip & Smith 21814*.—Lima: Río Chillón, 3,000 meters, *Pennell 14389*. San Buenaventura, 2,800 meters, *Pennell 14536*. Matucana, 2,400 meters, *79, 2908*. Mexico.

Commelina communis L. Sp. Pl. ed. 2. 60. 1762; 170.

Diffuse, glabrous or nearly so, with elongate stems often rooting at the nodes; leaves to 8 cm. long and 2 cm. wide; spathes 2 cm. long; upper racemes 3–4-flowered; capsule 2-celled, usually 4-seeded, the foveolate-rugose seeds 2–3 mm. long.—My material perhaps introduced. Supported in higher plants. Illustrated, Addisonia 1: *pl. 20*.

Lima: Huariaca, *3123* (det. Brückner). China.

Commelina elegans HBK. Nov. Gen. & Sp. 1: 259. 1816; 182.

Decumbent branches rooting at the nodes; leaves usually 5–10 cm. long; spathes 1.5–2 cm. long, united below; petals sometimes pale; seeds 3, ellipsoid, somewhat compressed, smooth, 3 mm. long.—Illustrated, Mart. Fl. Bras. 3, pt. 1: *pl. 37*.

Tumbes: Plain southwest of Hacienda La Choza, *Weberbauer 7715*.—Cuzco: Paucartambo, *Herrera 1113*.—Junín: La Merced, *Killip & Smith*.—San Martín: Tarapoto, *Williams 5575* in part, *5543, 5659, 5783*.—Loreto: Santa Catalina, *Raimondi*.—Without locality, *Weberbauer 6508*. General in tropical America.

Commelina fasciculata R. & P. Fl. 1: 44. *pl. 72*. 1798; 154. *C. nervosa* R. & P. loc. cit.

Procumbent-ascending, the branches often pubescent on one side; leaves about 1 dm. long, 1.5–2.5 cm. wide, villous or soon glabrous; spathes 2.5–4.5 cm. long, nearly glabrous; interior sepals connate; capsule 3-celled, 5-seeded, the subquadrate seeds 2–2.5 mm. long, foveolate.—According to Clarke, the free sepals illustrated are an error.

Lima: Chancai (*Pavón*). Puente Infiernillo (*Ball*). Matucana (*Ward*). Huariaca, *3128, 3131* (?; det. Brückner).—Huánuco: Cochero (*Ruiz & Pavón*). (*Mathews 1031, 1032*).—Puno: Lake Titicaca, 3,500 meters, (*Pentland*).—Arequipa: Cachendo, 1,000 meters (*Günther & Buchtien 353*). Mollendo, *Weberbauer 1449*.—

Cajamarca: San Pablo, *Weberbauer 3849.*—Ancash: Ocros, *Weberbauer 2744.*—Cuzco: Paucartambo, *Herrera 40.* Bolivia "Sara-sara."

Commelina graminifolia HBK. Nov. Gen. & Sp. 1: 258. 1816; 152.

Apparently very similar to *C. tuberosa* and *C. coelestis*, but perhaps distinguishable from the former in habit and in the narrower obovate-oblong sepals, and from the latter, more obviously, by the narrow, and elongate leaves.—The following collections referred here by Brückner as "var."

Ancash: Prov. Pomabamba, *Raimondi.*—Cajamarca: San Marcos region, *Raimondi.* Ranging northward to Mexico.

Commelina hispida R. & P. Fl. 1: 43. *pl. 73.* 1798; 156.

Closely related to *C. fasciculata;* leaves ovate-lanceolate, 2–4 cm. broad; interior sepals connate only at base, petaloid.—Var. *Gaudichaudii* Clarke has villous stems and leaves and scarcely exserted peduncles. My *3259* and *1446* from Mito seem to be the same, but apparently only vegetatively, as Brückner has compared the first with *C. communis* as a "spec. nov."

Lima: Atocongo, *Pennell 14767* (det. Brückner). Callao (*Gaudichaud*). Chancai (*Ruiz & Pavón*). Amancaes, *Weberbauer 1592.* San Gerónimo, *5918.*—Arequipa: Lomas of Atiquipa (*Tafalla*). —Junín: Huacapistana, *Weberbauer 2025* (det. Brückner, but the stems glabrous and the leaves narrow). Bolivia.

Commelina Jamesonii Clarke in DC. Monogr. 3: 155. 1881.

Similar to *C. fasciculata* and perhaps only a variety with spreading peduncles, shorter and narrower leaves, hirsute on both sides, and, especially, shorter sepals, about half as long.

Amazonas: Chachapoyas (*Mathews*). Ecuador.

Commelina longicaulis Jacq. Coll. Bot. 3: 234. 1789; 144. *C. gracilis* R. & P. Fl. 1: 44. *pl. 72.* 1789.

Procumbent or ascending, the stems often several dm. long, glabrous or nearly so; leaves ovate-lanceolate, 2.5 to several cm. long, acute or acuminate, the sheaths usually ciliate; spathes pointed, 1–2.5 cm. long, not united; seeds 2–3, oblong, 2–3 mm. long, reticulate.—Perhaps distinct from *C. nudiflora* L., with somewhat united spathes, to which, however, Clarke and others have referred it, including Brückner, at least as to the following specimens. The form with glabrous sheaths has been described as *C. gracilis*, var. *glabrata* Presl, Rel. Haenk. 1: 136. 1827.

Cajamarca: Casas, *Raimondi*.—Huánuco: (*Ruiz & Pavón*). Huánuco, 2,100 meters, *3520, 3226*.—Lima: (*Ruiz & Pavón; Haenke*). San Mateo, *Raimondi*. Lima, *Pennell 14797*. Chorrillos, *5866*. San Gerónimo, *5891*. Chosica, 900 meters, *487*.—Loreto: La Victoria, *Williams 2521*. Iquitos, *Klug 1208*. Río Itaya, *Williams 33, 245*. Lower Río Nanay, *Williams 276*. Puerto Arturo, *Williams 5129*.—San Martín: Lamas, *Williams 6374*. Widely distributed in tropical America.

Commelina monticola Seub. in Mart. Fl. Bras. 3, pt. 1: 264. 1855; 162.

To 1 meter high, supported in vegetation; branches hirsute; leaves scabrous above, 5–7 cm. long and 1 cm. broad; peduncles 1 cm. long or very short; spathes glabrate, 2 cm. long, shortly cucullate; seeds 5, rugose-foveolate, 2 mm. long.—*C. robusta* Kunth, similar, is nearly glabrous. *C. erecta* L. has longer leaves, and smooth puberulent seeds. *Williams 7172* from San Roque, San Martín, represents the former (Brückner). It appears to be only a glabrous state and, if so, is the earlier name.

Huánuco: Cochero (*Poeppig 1692*). Brazil to Central America.

Commelina tuberosa L. Sp. Pl. 41. 1753; 149.

Similar to *C. coelestis*, but diffuse; peduncles to 1.5 dm. long; leaves 1–2 cm. broad, the margins thin and pilose.—9. Illustrated, Bot. Mag. 41: *pl. 1695*.

Lima: Canta, *Pennell 14344* (?; det. Brückner). Mexico.

7. ATHYROCARPUS Schlecht.

Branching herbs with medium-sized leaves and few-flowered racemes partially included between spathe-like bracts. Two or 3 stamens sterile with hastate-triangular anthers. Filaments glabrous. Capsule 3-celled, 5-seeded, indehiscent.

Sheaths densely red-villous.....*A. rufipes*.

Sheaths glabrous or ciliate at throat.

Leaves long-acuminate, glabrous or nearly so. *A. persicariaefolius*.

Leaves acute, villous above.....*A. Matthewsii*.

Athyrocarpus Matthewsii (Clarke) Kuntze, Rev. Gen. 3: 319. 1898. *Phaeospherion Matthewsii* Clarke in DC. Monogr. 3: 137. 1881.

Branchlets long, densely bearded on one side; leaves about 1 dm. long and 2–2.5 cm. wide, minutely pilose beneath, villous above; racemes 3–5-flowered; spathes 2 cm. long.

Peru: (*Mathews 148*).

Athyrocarpus persicariaefolius (DC.) Hemsl. Biol. Centr. Am. Bot. 3: 386. 1885. *Commelina persicariaefolia* DC. in Redouté, Lil. 8. *pl. 472.* 1816. *Phaeospherion persicariaefolium* Clarke, var. *scabratum* Clarke in DC. Monogr. 3: 137. 1881.

Glabrous or nearly so, except the reddish-ciliate mouth of the sheaths; otherwise very similar to *A. rufipes*, but the difference in pubescence striking and constant in degree.

Loreto: Mainas (*Poeppig 2461*). North to British Guiana and the West Indies.

Athyrocarpus rufipes (Seub.) Standl. in Standl. & Cald. Lista Pl. Salvad. 47. 1925. *Commelina rufipes* Seub. in Mart. Fl. Bras. 3, pt. 1: 265. 1855.

Similar to *A. Matthewsii*, but the leaves long-acuminate and villous beneath and the sheaths red-hairy throughout, but the stems glabrous or nearly so.

Loreto: Iquitos, *Tessmann 5105, 3605; Klug 1343, 1485; Williams 3692.* Lower Río Nanay, *Williams 617, 665.* Yurimaguas, *Williams 4371; Killip & Smith 29108.* Mishuyacu, *Klug 201.* La Victoria, *Williams 2799.*—San Martín: Tarapoto, *Williams 6109.* Brazil to Central America.

8. CALLISIA L.

A procumbent-ascending, somewhat translucent, nearly glabrous herb with small leaves and almost tiny flowers, congested-axillary in sheaths or umbellulate. Stamens 3–6. Filaments glabrous. Capsule 2-celled, usually 4-seeded.

Callisia repens L. Sp. Pl. ed. 2. 62. 1762; 310.

Leaves to 2.5 cm. long and 1.5 cm. wide; sepals linear-oblong, 2–3 mm. long, the petals shorter; flowers scarcely exserted from the sheaths; style filiform.—*C. monandra* (Sw.) Schult. has umbellate flowers on exserted pedicels.—Illustrated, R. & P. Fl. 1: *pl. 73.*

Huánuco: (*Ruiz & Pavón*). Ambo, *3159* (det. Brückner).—Lima: Matucana, *321* (det. Brückner).—Cuzco: Ollantaitambo, *Pennell 13653* (det. Brückner).—Huancavelica: Huancamayo region, *Weberbauer 6569* (with 6 fertile stamens! Brückner).—Ayacucho:

Aina, 750–1,000 meters, *Killip & Smith 22702*. Widely distributed in tropical America.

9. ANEILEMA R. Br.

The Peruvian species a flaccid-stemmed herb with terminal panicles of small flowers not subtended by spathe-like bracts. Petals nearly similar. Lateral filaments barbellulate.

Aneilema ovato-oblongum Beauv. Fl. Oware 2: 71. *pl. 104.* 1818; 226.

Stems 2 to several dm. long, with rather numerous subovate leaves 5–6 cm. long and about 2 cm. wide; panicle lax, the branchlets slender; capsule 3–4 mm. long.

Loreto: Río Acre, *Ule 9160*. Iquitos, *Killip & Smith*. Yurimaguas, *Williams 4270, 3930*. Río Nanay, *Williams 539, 375* (all det. Brückner). South America; Africa.

10. GEOGENANTHUS Ule

Chamaeanthus Ule, Verh. Bot. Ver. Brandenb. 50: 71. 1908, not Schlechter.

Erect simple-stemmed herbs, with the leaves more or less crowded toward the apex, and with long-pediceled blue flowers, fasciculate-umbellate. Sepals and petals free. Fertile stamens 5 or 6, the 3 most strongly developed with pubescent filaments. Capsule 3-celled, with 5–6 ovules in each cell, often developing fewer seeds.

Leaves cuneate-elliptic, acuminate . . . . . *G. rhizanthus.*

Leaves rotund-ovate or suborbicular.

Leaves acute, marked above with stripes of paler green . *G. undatus.*

Leaves rounded at apex, apiculate, bluish green above . *G. ciliatus.*

Geogenanthus ciliatus Brückn. Notizbl. Bot. Gart. Berlin 11: 224. 1931.

Leaves about 1.5 dm. long and broad, densely ciliate on the margins, deep purple beneath; stems, sheaths, and few-flowered lateral fascicles more or less reddish-pubescent; pedicels to 12 mm. long; flowers brownish red, apparently small.

Loreto: San Antonio, *Killip & Smith 29347*, type.

Geogenanthus rhizanthus (Ule) Brückn. Notizbl. Bot. Gart. Berlin 10: 56. 1927. *Pyrrheima rhizantha* Ule, Verh. Bot. Ver. Brandenb. 50: 69. 1908.

Stems 1 meter high or less, glabrous or puberulent; leaves cuneate-elliptic, acuminate, rusty-pilose-ciliate, 2–2.5 dm. long and 8 cm. broad; petals long-bearded on the margins; capsule cells 6-seeded. Neg. 10735.

Loreto: Pongo de Cainarache, *Ule 6327*. Ecuador.

Geogenanthus undatus (C. Koch & Lind.) Mildbr. & Strauss, Repert. Sp. Nov. 12: 279. 1913. *Dichorisandra undata* C. Koch & Lind. Wochenschr. 9: 346. 1866. *Chamaeanthus Wittianus* Ule, Verh. Bot. Ver. Brandenb. 50; 71. 1908.

Often lower and more slender; leaves rotund-ovate, acute, about 1 dm. long or shorter and 5–8 cm. broad; capsule cells 2-seeded.—Illustrated, Fl. Serres 17: 87. *pl. 1763–1764*. Especially in cultivation the nerves are marked above with stripes of lighter green, and the stems and leaves beneath are purple or purplish.

Loreto: Mainas (*Wallis*); *Williams 5338, 5065, 5298*.—Junín: *Raimondi* (det. Brückner). Brazil.

11. ZEBRINA Schnizl.

A slender-stemmed herb with spathe-bracted tubular flowers. Stamens 6, equal, the filaments hairy or glabrous.—Often cultivated, this is the "Wandering Jew" of English-speaking people.

Zebrina pendula Schnizl. Bot. Zeit. 7: 870. 1829; 318.

Decumbent or pendulous, often glabrous except for the densely long-ciliate sheaths; leaves ovate-lanceolate, purplish beneath, 3–5 cm. long and 1–2 cm. broad; flowers nearly included in the spathe-like uppermost leaves.

Loreto: Soledad, *Tessmann 5196* (det. Brückner). Near Iquitos, *Klug 360* (det. Brückner); cultivated, *Williams 3628*. Pebas, *Williams 1831*. Yurimaguas, in garden, *Williams 4509*. Ranging to Mexico.

27. PONTEDERIACEAE. Pickerel-weed Family

The three Peruvian genera are easily distinguished: *Heteranthera* grows in mud and has small, loosely borne flowers with 3 stamens; *Eichhornia* and *Pontederia* have showy 6-stamened flowers in dense spikes; the former floats, and the latter is erect in mud or shallow water.

1. EICHHORNIA Kunth. Water hyacinth

Flowers tubular, with a spreading limb. Capsule 3-celled, many-seeded.—The name is conserved.

Eichhornia crassipes (Mart.) Solms in DC. Monogr. 4: 527. 1883. *Pontederia crassipes* Mart. Nov. Gen. & Sp. 1: 9. *pl. 4.* 1824. *Piaropus crassipes* Britton, Ann. N. Y. Acad. Sci. 7: 241. 1893.

Well marked by its tufted leaves with inflated petioles and its floating habit.—*E. diversifolia* (Vahl) Urban has alternate leaves, the submerged ones grass-like.

Loreto: "Rare on the Ucayali" (*Huber*). Caballo-cocha, *Williams 2426*. South America.

2. HETERANTHERA R. & P.

Creeping, with cordate-reniform petioled leaves and a few tubular blossoms. Ovary 3-celled, many-ovuled.—The name is conserved.

Heteranthera reniformis R. & P. Fl. 1: 43. *pl. 71.* 1798.

Flowers whitish or pale blue; stamens unequal.—*H. limosa* (Sw.) Willd. usually has ovate leaves and often blue flowers, solitary in the spathes.

Lima: Lurín, Surco, and vicinity (*Ruiz & Pavón*). Weberbauer, 149.—Amazonas: Rioja, west of Moyobamba, *Weberbauer 4711*; 149.—Loreto: La Victoria, *Williams 3097*. Pebas, *Williams 1854*. Iquitos, *Tessmann 3894a; Killip & Smith 27177*. Yurimaguas, *Killip & Smith 27960*. General in tropical America.

3. PONTEDERIA L. Pickerel-weed

Perianth with a short tube. Capsule 1-celled, 1-seeded.

Pontederia rotundifolia L. f. Suppl. 192. 1781.

Leaves orbicular-subcordate, very obtuse, 1–2 dm. long; inflorescence capitate, with an involucral spathe.—*P. cordata* L. has cordate-oblong leaves and oblong-ovate spikes.

Loreto: Río Sarayacu (*Huber 1491*). General in tropical America.

28. JUNCACEAE. Rush Family

Reference: Buchenau, Pflanzenr. IV. 36. 1906.

This family in most parts of the world is of little economic importance, but in Peru *Distichia* generally constitutes the larger part of the *champa* upon which many of the dwellers in the higher Andes depend chiefly for fuel. Without the dried blocks of this cushion plant it would be difficult for thousands to live on the higher slopes, grow the country's supply of potatoes, and range the sheep, cattle,

and llamas. These ordinary plants, therefore are of exceptional economic significance.

Densely pulvinate plants with imbricate leaves.

Leaves closely imbricate, erect, pointed.....1. *Distichia.*

Leaves somewhat divaricate, long-caudate.....2. *Oxychloe.*

Loosely leafy or not pulvinate perennials or annuals.

Leaves more or less ciliate-pubescent; seeds 3.....3. *Luzula.*

Leaves glabrous; seeds many.....4. *Juncus.*

1. DISTICHIA Nees & Meyen

This low plant, forming such dense and hard cushions that a mass is often broken with difficulty, even with an axe, is unmistakable. There is a beautiful photograph by Weberbauer (*pl. 16*) of a highly characteristic *Distichia* moor, and a figure of the plant (p. 214).

Distichia muscoides Nees & Meyen, Nov. Act. Acad. Nat. Cur. 19: Suppl. 1: 128. 1843.

Leaves 3–7 mm. long, with a callous-obtuse tip.—The similar *D. filamentosa* (Buchenau) Griseb., of Bolivia, has longer (6–15 mm.) leaves terminating in a bristle 2–4 mm. long.

Puno: Titicaca Highlands, *Weberbauer 948;* 219. Agapata, *Lechler 1954.*—Junín: Yauli, 4,400 meters, *Weberbauer,* 222. Morococha, 4,500 meters, *899; Hauthal 370.* Between Chiquián and Pucha valleys, 4,300 meters, *Weberbauer.*—Puno: Pisacoma, *Meyen.*—Libertad: Quiruvilca, 4,200 meters, *Weberbauer 7089.*—Ancash: Weberbauer, 224.—Huánuco: Yanashallas, *2484.*—Cuzco: La Raya, *Pennell 13492.*—Lima: East of Canta, *Pennell 14693.* Andes of South America. "Champa."

2. OXYCHLOE Philippi

Similar in habit to *Distichia,* with which it could be merged, but conveniently separable, particularly by the long-caudate or rather spine-like, spreading leaves.

Oxychloe andina Phillippi, Reise Atac. 52. *pl. 6.* 1860.

There is an illustration in Pflanzenr. IV. 36: 37.

Puno: Sandía, 4,400 meters, *Weberbauer 987.* Bolivia and Argentina.

3. LUZULA DC.

Soft-leaved, leafy-stemmed, more or less pubescent perennials. Leaf sheaths closed. Capsule 1-celled.—The name is conserved.

The widely distributed *L. campestris* (L.) DC. could occur. It has an umbellate inflorescence and usually entire perianth segments only 2–3 mm. long. At least the last three species in the key are very doubtfully distinct.

Inflorescence many-flowered, very compound, the flowers mostly scattered, sometimes subcorymbose.....*L. gigantea.*

Inflorescence rather few-flowered and simple, the flowers spicate or in little heads.

Inflorescence open or narrowly oblong; perianth segments entire or crenulate-ciliate.

Perianth segments white-membranous, not exceeding the capsule. *L. chilensis.*

Perianth segments distinctly longer than the capsule, brown, at least below.....*L. racemosa.*

Inflorescence dense and ovate or lobate; perianth segments lacerate-denticulate or black-aristate.

Low plants, to 6.5 cm. high; inflorescence white-villous. *L. macusaniensis.*

Usually 1–3 dm. high; inflorescence brownish or blackish. *L. peruviana.*

Luzula chilensis Nees & Meyen in Kunth, Enum. 3: 312. 1841; 74.

Except as indicated, similar to *L. racemosa*, to which it could be referred as a variety, but typically its character is reasonably definite. It is as yet unknown from Peru but almost certainly occurs. Chile.

Luzula gigantea Desv. Journ. Bot. 1: 145. 1808; 59.

A beautiful plant with gracefully borne, narrowly acuminate leaves and more or less nodding, abundantly flowered corymbs.—Sometimes several dm. high. Its habit separates it at once from *L. racemosa* which, in a broad sense, is our only other species. *L. sylvatica* (Huds.) Gaud., recorded from Peru on the basis of a Pavón specimen, which I have not seen, is probably an error, as suggested by Buchenau, op. cit. 55. Other South American material referred to that species, because of the characteristic corymbose inflorescence, could be a juvenile state of *L. Ulei.*

Cajamarca: Cutervo, *Raimondi.* Hualgayoc, *Weberbauer 4025.* —Junín: Tarma, *Ruiz* (all det. Markgraf & Gross).—Huánuco:

Mito, *3367*. Tambo de Vaca, *4388*.—Ayacucho: Choimacota Valley, *Weberbauer 7585*. Bolivia to Mexico.

Luzula macusaniensis Steud. ex Buchenau, Abh. Nat. Ver. Brem. 4: 131. *pl. 3*. 1874; 78.

Little plants 2 to several cm. high, with long-ciliate leaves 1 mm. broad; inflorescence ovate or conical, exceeded by the 2–3 bracts; flowers 3.2 mm. long, the segments more or less hyaline and lacerate and ciliate above; stamens 3. At 4,000–4,800 meters.

Junín: La Oroya, 4,300 meters, *Weberbauer 2608* (?; det. Buchenau).—Puno: Macusani, *Lechler 1839*. Ananea, *Weberbauer 958, 1033* (det. Engler).—Ancash: Above Ocros, *Weberbauer 2795;* (det. Buchenau).

Luzula peruviana Desv. Journ. Bot. 1: 160. 1808.; 78. *L. boliviensis* Buchenau, Abh. Nat. Ver. Brem. 4: 128. *pl. 4*. 1874.

Usually about 3 dm. high, but also smaller, with densely ciliate to glabrate leaves 1.5–4 mm. broad; inflorescence erect or nodding, conical or ovoid, compact or more or less "lobed," equaled or exceeded by the leaf-like bracts; flowers 4 mm. long, the segments more or less ciliate, brown; stamens 3.—As suggested, this is a variable species, forms approaching *L. racemosa* and, it may be added, low states, *L. macusaniensis*.

Puno: Asángoro, *Lechler 1739*.—Ancash: Ocros to Chonta, 4,500 meters, *Weberbauer 2807*.—Junín: Near Huacapistana and Palca, 3,500 meters, *Weberbauer 2257, 2474, 6623, 6475* (the last two det. Gross). Bolivia to Central America.

Luzula racemosa Desv. Journ. Bot. 1: 162. 1808; 75.

Often several dm. high, with more or less ciliate leaves varying from 1–6 mm. in breadth and with a simple or compound but narrow and mostly nodding inflorescence; bracts not at all or scarcely leaf-like; flowers 2–3 mm. long, the outer segments aristate; stamens mostly 3.—A low form is var. *humilis* (Buch.) Ball, Journ. Linn. Soc. Bot. 22: 57. 1885, and there is a very slender form typified by *Weberbauer 2449* from Palca (det. Buchenau).

Lima: Chicla (*Ball*); *Weberbauer 248* (det. Engler). Matucana, *Raimondi* (det. Gross).—Cajamarca: Cutervo, *Raimondi* (det. Gross). Ocros, 3,500 meters, *Weberbauer 2696* (det. Buchenau).—Ancash: Huaraz, 4,200 meters, *Weberbauer 3072* (det. Buchenau).—Puno: Asángoro, 4,000 meters, *Weberbauer 496* (det. Engler).

Araranca, 4,200 meters, *Pennell 13456*.—Cuzco: Paso de Tres Cruces, 3,800 meters, *Pennell 13846* (det. Gross).—Huánuco: Tambo de Vaca, *4389* (inflorescence short; det. Gross). Chile to Mexico.

4. JUNCUS L. Rush

Always glabrous and usually perennial. Sheaths of the leaves typically open and not infrequently auricled. Capsule 1–3-celled. In the Peruvian species the stamens are usually 6 unless otherwise stated.—Some of the taller wiry species are much used to tie bunches of fruits and vegetables.

Stems usually scapose; leaves undeveloped or usually all crowded below, never septate; inflorescence open or pseudo-lateral.

Plants annual.....*J. bufonius.*

Plants perennial.

Leaves well developed.

Inflorescence terminal, exceeding or not greatly exceeded by the bract.

Flowers about 3.5 mm. long.....*J. tenuis.*

Flowers about 5 mm. long.....*J. imbricatus.*

Inflorescence pseudolateral, i.e., exceeded many times by the bract.....*J. capillaceus.*

Leaves undeveloped, sheath-like.

Flowers about 2 mm. long.....*J. effusus.*

Flowers usually 3–4 mm. long.....*J. balticus.*

Flowers 5–7 mm. long.....*J. andicola.*

Stems more or less leafy, the leaves septate, or, if not, grass-like and the inflorescence capitate.

Leaves septate, sometimes not obviously.

Low plants, rarely 1 dm. high.

Leaves obviously septate; flowers capitate.....*J. stipulatus.*

Leaves obscurely septate; flowers mostly single..*J. Mandoni.*

Plants usually more than 1.5 dm. tall.

Inflorescence 1–3 cm. broad and somewhat echinate-bracteate.

Inflorescence about 1.5–3 cm. broad.....*J. involucratus.*

Inflorescence about 1 cm. broad.....*J. densiflorus.*

Inflorescence usually narrower, not echinate-bracteate.

Flowers reddish; anthers and filaments very unequal.

Flowers 2–6 (–10), 3–4 mm. long.....*J. microcephalus.*
Flowers 6–10, 4–5 mm. long.....*J. Dombeyanus.*
Flowers nearly black; anthers and filaments subequal.
Septa of leaves obscure; flowers 2.5–3 mm. long.
J. Liebmanni.
Septa obvious; flowers 3–5 mm. long.....*J. brunneus.*
Leaves not septate; plants ascending-erect.....*J. cyperoides.*

Juncus andicola Hook. Icon. 8: *pl. 714.* 1848; 148. *J. Lesurii* (*Lesueurii*) of auth. in part.

Stems densely cespitose, to 5 dm. high, 4–6 mm. thick; inflorescence dense and somewhat lobate; bracts 8–16 cm. long, or twice as long; filaments 0.5–1 mm. long; anthers 1–1.25 mm. long; perianth segments green with reddish brown sides and thin edges, exceeding the mucronate fruit.

Huánuco: Llata, 2,500 meters, *2272.* Below Chavanillo, *2306.*—Ancash: Yungai, *Weberbauer 3283.* Colombia to Chile and Bolivia.

Juncus andicola var. **Schulz-Korthii** Macbr. Field Mus. Bot. 11: 44. 1931.

Robust, 10–12 dm. high, the stems 11 mm. in diameter below, the sheaths to 1.5 dm. long; inflorescence pale; perianth 5–6 mm. long; anthers 1.2 mm. long, on filaments 0.5 mm. long; capsule hardly 4 mm. long. Neg. 11689.

Puno: Pucará, *Weberbauer 1367.* San Antonio (*Lechler 1808,* probably).

Juncus balticus Willd. Ges. Naturf. Freund. Berl. Mag. 3: 298. 1809; 144.

Stems slender, terete, strict, 2.5–7.5 dm. high and as much as 2.5 mm. thick; inflorescence many-flowered, the branches elongate; lower bracts 5–20 cm. long; perianth segments greenish and brown-chestnut with pale margins, equaling or shorter than the nearly pyramidal, mucronate capsule.—Widely distributed in the Old and New Worlds except in the tropics. The var. *mexicanus* (Willd.) Kuntze probably occurs in Peru. Neg. 10728.

Cuzco: (*Herrera*).—Puno: Chuquibambilla, *Pennell 13379* (det. Gross).

Juncus brunneus Buchenau, Abh. Nat. Ver. Brem. 6: 403. 1879; 206.

Stems 2–3 dm. high, strict or compressed; septa prominent; heads 1–3, many-flowered, subglobose, capsule attenuate, more or less

exceeding the perianth; style long.—The heads are very dark. 128.—Illustrated, Pflanzenr. IV. 36: 207.

Ancash: Above Samanco, 3,500 meters, *Weberbauer 2700* (det. Buchenau).—Puno: Asángaro, *Lechler 1749.* Island of Titicaca (*Copeland*).—Cajamarca: Nanchó, *Raimondi* (det. Markgraf); Bolivia.

Juncus bufonius L. Sp. Pl. 328. 1753; 105.

This small tufted species, common to wet sunny places around the world, needs no characterization here, especially since it is the only annual *Juncus* of Peru.

Cajamarca: Cutervo, *Raimondi* (det. Gross).—Without locality (*Kaenke*).

Juncus capillaceus Lam. Encycl. 3: 266. 1789; 122.

Stems and leaves filiform, to 2.5 dm. long; flowers few, pale, 3–3.5 mm. long, far exceeded by the lower bract, so appearing lateral; capsule retuse.—Illustrated, Pflanzenr. IV. 36: 122.

Cajamarca: Nanchó, *Raimondi* (det. Markgraf). Argentina to Ecuador.

Juncus cyperoides Laharpe, Monogr. Jonc. 145. 1827; 241. *J. graminifolius* E. Mey. ex Presl, Rel. Haenk. 1: 144. 1827.

Stems leafy above, the leaves 2–12 mm. broad.—Well marked by its Luzula-like aspect.

Huánuco: (*Haenke*). Mito, *3319.*—Amazonas: Chachapoyas, *Mathews.*—Cajamarca: Nanchó, *Raimondi* (det. Markgraf and Gross).

Juncus densiflorus HBK. Nov. Gen. & Sp. 1: 238. 1816; 187.

Stems stout, 1 meter tall or taller, from a very thick rhizome; cauline leaves 1–3, cylindric, to 3 mm. thick; inflorescence erect, the numerous many-flowered heads 6–10 mm. in diameter; flowers straw-colored or brownish, rigid; stamens 3; capsule shortly beaked, slightly exceeded by the inner perianth segments.—*J. scirpoides* Lam. of Brazil, which may be expected, may be distinguished by its beaked capsule lightly exceeding the perianth. Neg. 10726.

Peru: Probably occurring. Argentina; Colombia.

Juncus Dombeyanus Gay in Laharpe, Monogr. Jonc. 132. 1827; 199.

Like *J. microcephalus* except for the glabrous flower heads, these 6–12 mm. in diameter (in var. *pycnanthus* Buchenau to 17 mm.),

and the slightly longer flowers.—The capsule is evidently shorter than the perianth. 166.

Cajamarca: Cutervo, *Raimondi.* Huancayo, *Esposto* (?) (both det. Markgraf).—Huánuco: Mito, *1450.*—Junín: Tarma, *1030.*—Cuzco: San Sebastián, *Pennell 13619* (det. Gross).—Without locality: *Dombey; Haenke.* Uruguay; Chile.

Juncus effusus L. Sp. Pl. 326. 1753; 135.

Rather similar to *J. balticus,* but the flowers only half as long and the stamens usually 3.

Amazonas: Chachapoyas, *Mathews.* Widely distributed in both hemispheres.

Juncus imbricatus Laharpe, Monogr. Jonc. 149. 1827; 121.

Similar to *J. capillaceus,* but the stems and leaves not so fine and the few to many flowers to 6 mm. long, sometimes conspicuously exceeded by the bract in var. *Lechleri* (Steud.) Buchenau.

Puno: (*Lechler*).—Cajamarca: Cutervo, *Raimondi* (the var., det Markgraf).—Huánuco: Mito, 3,000 meters, *1451.*—Junín: Chinche, 3,500 meters, *1276.* Ecuador to Chile and Argentina.

Juncus involucratus Steud. ex Buchenau, Abh. Nat. Ver. Brem. 3: 121. 1874; 187.

Usually lower than *J. densiflorus;* inflorescence lobate; stamens rarely if ever only 3.—Inflorescence densely capitate, often a single head.

Puno: Tabina, *Lechler 2078.* Bolivia to Colombia.

Juncus Liebmanni Macbr. Field Mus. Bot. 11: 9. 1931. *J. brevifolius* Liebm. Kjøb. Vid. Medd. 40. 1850, not Hoffm. & Link ex Rostk. 1801.

Except for the scarcely apparent septa and the smaller flowers, this species closely resembles *J. brunneus;* the capsule is trigonous-ovate.

Peru: Probably occurring. Mexico; Ecuador.

Juncus Mandoni Buchenau, Abh. Nat. Ver. Brem. 4: 121. *pl. 3.* 1874; 169. *J. depauperatus* Philippi, Fl. Atac. 53. 1860; An. Univ. Chil. 93: 277. 1896, not Tenore, 1830.

Pulvinate-cespitose from diffuse filiform rhizomes; sheaths long, pale; leaves 1.5–3 cm. long, filiform, grooved above; flowers 3–3.5 mm. long, often peduncled in the leaf axils or rarely bracteate and

subsessile; style very short; capsule equaling the greenish perianth, orbicular-trigonous.

Peru: (According to Hicken.). Bolivia; Chile; Argentina.

Juncus microcephalus HBK. Nov. Gen. & Sp. 1: 237. 1816; 198.

A variable species, 1.5 to many dm. high, the culms more or less compressed, the leaves usually slightly so; inflorescence compound, anthelate; perianth segments mostly reddish dorsally, with broad thin margins; capsule broadly ovate or obovate.—*J. rubens* Lam., if the same, is an earlier name.

Cajamarca: Cutervo, *Raimondi* (det. Markgraf). Mexico to Chile and Argentina.

Juncus stipulatus Nees & Meyen, Nov. Act. Acad. Nat. Cur. 19: Suppl. 1: 126. 1843; 171. *J. microcephalus* HBK. var. *pusillus* Presl, Rel. Haenk. 1: 142. 1827(?).

Stems 1–5 or rarely 10 cm. high; inflorescence simple or compound, with 1 to several heads; capsule a little longer than the brownish perianth; style elongate.—*J. chilensis* Gay is similar, but the capsule is shorter and the style is very short.

Peru: Probably occurring. Ecuador to Chile.

Juncus tenuis Willd. Sp. Pl. 2: 214. 1799; 115.

Stems often tall, about equaled by the curved flat leaves 1–15 mm. broad; inflorescence open, more or less anthelate, with 1–3 long bracts; capsule shorter than the yellow-green, mostly remote flowers. —Widely distributed. The var. *platycaulos* (HBK.) Buch. Monogr. 194. 1890, lacks the large auricles of *J. tenuis*. As Buchenau suggests (Pflanzenr. IV. 36: 117), it is probably the same as (and an earlier name for) *J. dichotomus* Ell. Its leaves are distinctly grooved and the inflorescence more anthelate. Neg. 10727.

Cajamarca: Nanchó, *Raimondi* (as the var., det. Markgraf & Gross). North and South America.

29. LILIACEAE. Lily Family

Reference: Krause, Pflanzenfam. ed. 2. 15a: 227–386. 1930.

A number of the well-known plants of this family are widely cultivated in Peru and now and then occur or sometimes perhaps persist as escapes. Notable among them are the "cebolla" and "ajo" (*Allium Cepa* L. and *A. sativum* L.), i.e. the most useful onions

and garlic, natives of Asia, but greatly appreciated in all countries. Others of some economic importance include asparagus, the "espárrago" or "esparraguero" (*Asparagus officinalis* L.); aloes, the "sábila"or "zábila" (*Aloe vera* L. or *A. soccotrina* Lam.); and "cebadilla" (*Veratrum officinale* Schl.), sold in the markets (Herrera) as "jamiccatu." Those usual to flower gardens, of course, are found also, as the "tulipán" (*Tulipa*), "agapanto" (*Agapanthus umbellatus*); the "azucena blanca" (*Lilium candidum*), this (acc. to Herrera) of some medicinal repute; and *Taetsia fruticosa* (L.) Merr.

The genus *Herreria*, well marked by its densely fascicled, whorled leaves, is unknown from Peru, collections so labeled certainly originating in Chile. An undescribed herb with umbellate, green and purple flowers, apparently, allied to *Gillesia*, has been found by Herrera at Pincopata, Cuzco.

Flowers umbellate or borne in a branching inflorescence.
  Flowers blue.
    Stout plants about 1 meter high with large flowers. 1. *Excremis.*
    Slender plants, much lower, with small flowers. . . . 2. *Pasithea.*
  Flowers not blue.
    Erect herbs.
      Flowers not umbellate. . . . . 5. *Chlorophytum.*
      Flowers in terminal umbels.
        Segments 1-nerved. . . . . 3. *Nothoscordum.*
        Segments 5-nerved. . . . . 4. *Trichlora.*
    Leafy vines. . . . . 8. *Smilax.*

Flowers in a simple, close or lax raceme or one or two in leaf axils or in the axils of the upper bract-like leaves.
  Erect herbs.
    Flowers distant and long-pediceled.
      Anthers oblong-oval; bulbous plants. . . . . 7. *Fortunatia.*
      Anthers linear; rhizomatous plants. . . . . 6. *Anthericum.*
    Flowers approximate and shortly pediceled. . . . . 10. *Tofieldia.*
  Creeping or sprawling, shrubby plants. . . . . 9. *Luzuriaga.*

1. EXCREMIS Willd.

Coarse plants from short rhizomes, the lance-linear leaves crowded below and gradually reduced above to bracts. Flowers deep blue, borne rather loosely on nodding pedicels that terminate the paniculately branched stem.

Excremis coarctata (R. & P.) Baker, Journ. Linn. Soc. Bot. 15: 320. 1876. *Anthericum coarctatum* R. & P. Fl. 3: 67. *pl. 299.* 1802.

A stout, rather conspicuous plant, sometimes 1.5 meters high.—A useful lasting yellow color is obtainable from the plant (*Ruiz & Pavón*). My specimens grew in dense woods.

Cuzco: Cerro de Cusilluyoc, *Pennell 13966* (det. Diels).—Huánuco: Tambillo and Pillao (*Ruiz & Pavón*). Chinchao, *5106.* Monzón, *Weberbauer 3516* (det. Krause).—Puno: Sandía region, *Weberbauer 1327.*—Amazonas: East of Chachapoyas, *Weberbauer 4396.*

2. PASITHEA D. Don

Stems from a short erect rhizome, densely leafy at base, sparsely so above and paniculately branched, bearing long-pediceled flowers in a loose, pyramidal or thyrsoid inflorescence. Bracts minute or none.

Pasithea coerulea (R. & P.) D. Don, Edinb. N. Phil. Journ. 13: 237. 1832. *Anthericum coeruleum* R. & P. Fl. 3: 67. 1802.

A slender plant, sometimes 6 dm. high, of lomas.—Illustrated, Bot. Mag. 118; *pl. 7249.*

Arequipa: Loma de Atico, *Raimondi* (det. Krause). Mollendo, *Weberbauer 1524, 1570.* Below Cachendo, 900 meters (*Günther & Buchtien 350*). Chile. "Espuela de caballero," "illcu."

3. NOTHOSCORDUM Kunth

Reference: Beauverd, Bull. Herb. Boiss. II. 8: 993–1007. 1908.

Bulbous plants similar to onions but lacking the odor of the latter, and the perianth segments more or less united. Stamens 6, all fertile.—The generic name has been conserved. The genus is maintained distinct from *Allium* only as a matter of convenience. The species, as they have been proposed, are mostly of doubtful validity.

Scapes well developed.

Pedicels subequal, about 1 cm. long, the flowers (usually purplish) and fruits crowded ..... *N. andicola.*

Pedicels mostly unequal, the longer often 2 cm. long, the umbel of usually whitish flowers open.

Coarse plants, the leaves usually 4–10 mm. wide; capsule obcordate ..... *N. inodorum.*

Slender plants with narrow leaves; capsule elliptic or subglobose. *N. bivalve, N. gramineum.*

Scapes concealed in the bulb neck..... *N. fictile.*

Nothoscordum andicola Kunth, Enum. 4: 463. 1843. *Allium bivalve* (L.) Kuntze, var. *andicola* Kuntze, Rev. Gen. 3: 313. 1898. *A. andicolum* Regel, Nov. Act. Petrop. 3: 211. 1875.

Bulbs obconic, 2–3 cm. long, 1–1.5 cm. wide; scapes 3–15 cm. long; leaves 1–4 mm. wide; flowers few, roseate, the obovate-elliptic segments united below for one-third their length; style equaling the oblong ovary.—Typically well marked but varying, especially in habit, though usually low. Neg. 10008.

Puno: Lake Titicaca, *Meyen.*—Cuzco: Sacsahuamán, *Herrera 2381, 935, 126* (det. Herb. Dahlem).—Arequipa: *Weberbauer 6878.*—Moquehua: Carumas, *Weberbauer 7311.* To Argentina and Chile. "Chchullcos," "añas-sibilla," "chchullcu."

Nothoscordum bivalve (L.) Britton, Ill. Fl. 1: 415. 1896. *Ornithogalum bivalve* L. Sp. Pl. 306. 1753. *Allium bivalve* Kuntze, Rev. Gen. 3: 312. 1898. *N. striatum* Kunth, Enum. 4: 459. 1843. *A. striatum* Jacq. Coll. Suppl. 51. 1796; Icon. 2: *pl. 366.* 1786–93.

Bulb subglobose, often proliferous; scapes usually 1–2 dm. high; leaves 1–3 mm. wide; spathe valves linear-lanceolate, shorter than the pedicels; perianth segments white, with brown or green nerves, oblong-lanceolate, 1 cm. long; anthers ovate-oblong; style filiform, about as long as or longer than the depressed-globose capsule.—Probably the following collections are rather *N. andicola.*

Arequipa: Near Mejía, 200 meters (*Günther & Buchtien 348*).—Cuzco: Prov. Canchis, 3,550 meters (*Hicken*). South America to eastern Canada.

Nothoscordum fictile Macbr. Field Mus. Bot. 11: 12. 1931.

A very well-marked plant because of its large bulbs, to 3 cm. thick, with a neck 8–15 cm. long; leaves prostrate, 1–1.5 dm. long, 5–8 mm. wide; scape not obvious, the white flowers 5 mm. long, on slender pedicels 2 cm. long; capsule oblong, 4 mm. long, the style scarcely 1 mm. long.—Related to *N. sessile* (R. E. Fries) Beauv., of Argentina, but the leaves much broader, the style shorter, and the capsule longer. Grass steppes. Later, with the specimens not before me, it seems to me doubtful if this is a *Nothoscordum.*

Moquehua: Carumas, 3,300 meters, *Weberbauer 7262,* type.

Nothoscordum gramineum (Sims) Beauv. Bull. Herb. Boiss. II. 8: 1002, 1004. 1908. *Ornithogalum gramineum* Sims, Bot. Mag. 50: *pl. 2419.* 1823. *N. striatellum* Kunth, Enum. 4: 458. 1843. *Allium striatellum* Lindl. Trans. Hort. Soc. 6: 97. 1851. *N. flavescens* (Poepp.) Kunth, op. cit. 459. *A. bivalve* (L.) Kuntze, var. *flavescens* Kuntze, Rev. Gen. 3: 313. 1898.

Bulb about 1 cm. thick; scape 5–15 cm. long, scarcely rigid; leaves 2 mm. wide; flowers about 6, on pedicels longer than the ovate-lanceolate spathe valves; perianth segments yellow or yellowish, oblong-elliptic, faintly nerved; style a little longer than the ovary.—Probably only a form of *N. bivalve.* Neg. 10009.

Cuzco: (acc. to Herrera). Chile to Uruguay and north to Mexico. "Guilli de perro."

Nothoscordum inodorum (Ait.) Asch. & Graebn. Syn. Mitt. Eur. Fl. 3: 167. 1905. *Allium inodorum* Ait. Hort. Kew. 1: 427. 1789.

Bulb subglobose, about 1 cm. in diameter; leaves usually 4–10 mm. wide or wider; scapes 2–4 dm. high; flowers usually lilac-tinted, fragrant, the elliptic segments connate about one-half their length; anthers lanceolate; ovary obcordate.—Widely distributed in warm countries or naturalized. Not clearly distinct from *N. bivalve* in the color of the flowers, but the shape of the larger capsule is diagnostic. The following young specimen perhaps should be referred to *N. bivalve* or proposed as another form.

Junín: Tarma, *Killip & Smith 21879*(?).

4. TRICHLORA Baker

An onion-like plant, but the 2 involucral bracts very unequal, one spathe-like, the other narrow, and the stamens united at base and only 3 of them fertile.

Trichlora peruviana Baker in Hook. Icon. 13: 29. *pl. 1237.* 1877.

Leaves linear, all basal; flowers long-pediceled, yellowish.

Lima: Tambo de Viso region, *Weberbauer 132;* 164, 166. Obrajillo and Surco to San Mateo, *Raimondi* (det. Kränzlin).

5. CHLOROPHYTUM Ker

Schidospermum Griseb. in Lechler, Berb. Amer. Austr. 56. 1857.

Nearly *Anthericum* except for the acutely angled capsule, but the single Peruvian species readily recognized by the loosely branching

inflorescence. Leaves all from the short rhizome.—The plant has the aspect of some bromeliads.

Chlorophytum schidospermum Baker, Journ. Linn. Soc. Bot. 15: 326. 1876.

Leaves thin, lanceolate; stems 2–3 dm. high; flowers white, small.

Puno: Sangabán, *Lechler 2382.* Sandía region, *Weberbauer 1204;* 279.—Junín: Chanchamayo Valley, *Schunke 273* (det. I. M. Johnston).

6. ANTHERICUM L.

Roots often fleshy; leaves grass-like, all basal, or the lower bracts leaf-like; inflorescence wand-like, bracteate; capsule keg-shaped, bluntly or obscurely if at all 3-lobed.

Leaves about 1 cm. wide or wider.

Leaves glabrous or sparsely ciliate on the edges . *A. eccremorrhizum.*

Leaves densely ciliate on the edges . . . . . *A. Herrerae.*

Leaves about 5 mm. wide, strongly conduplicate . . . . . *A. glaucum.*

Anthericum eccremorrhizum R. & P. Fl. 3: 67. *pl. 301.* 1802.

A rather coarse, glabrous or nearly glabrous plant with broad (to 2.5 cm.) ensiform leaves and usually many white or yellowish white flowers borne in twos or threes at each bract, the lowest of which are often leaf-like.—Variable in size and pubescence. *A. latifolium* (HBK.) R. & S., not Peruvian, seems to be the same. Neg. 12987.

Ancash: Ocros, *Weberbauer 2749.*—Lima: Chancai (*Ruiz & Pavón*). Puente Infiernillo (*Ball*). Matucana, *2933, 81.* Barranco, *Weberbauer 1604, 1645.*—Arequipa: Mollendo, *Weberbauer 1508.* Posco, 650 meters (*Günther & Buchtien 351*).—Cuzco: Paucartambo Valley, *Herrera 147, 2332.*—Junín: Río Blanco, *Killip & Smith 21638.*

Anthericum glaucum R. & P. Fl. 3: 68. 1802.

A slender glabrous plant with much narrower leaves that are glaucous above; perianth segments white, green dorsally and apically or sometimes yellow (*Weberbauer 6841,* with broader leaves).—*A. peruviana* Willd. Herb. is this species and not *A. ciliata!*—Illustrated, Bot. Mag. 64: *pl. 3610.* Neg. 9996.

Junín: Tarma, *Weberbauer 2355;* 176; *Raimondi;* (*Ruiz & Pavón*); *Killip & Smith 21797.*—Lima: Chorrillos, 150 meters, *5857.* Canta,

Pennell 14580.—Huancavelica: Below Surcubamba, *Weberbauer 6881.* On the Marañón at Balyas, *Stuebel 48a.*

Anthericum Herrerae Killip, Journ. Wash. Acad. Sci. 16: 566. 1926.

About 3 dm. high, with linear leaves to 1 cm. wide that are densely ciliate; flowers yellowish white, the narrowly oblanceolate segments about 1 cm. long and 2–3 mm. wide; filaments 5 mm. long.—Except for the flowers, similar to *A. Sprengelii* Rusby (*A. ciliatum* R. & S.), supposed to have longer filaments; but it is not clear to me how *A. Herrerae* can be distinguished from *A. eccremorrhizum.*

Cuzco: Paucartambo Valley, 3,500 meters, *Herrera 1012.*

7. FORTUNATIA Macbr.

Scilla L. sect.(?) *Hesperoscilla* Benth. in Benth. & Hook. Gen. Pl. 3: 815. 1883.

A small bulbous plant with basal linear leaves and medium-sized white flowers mostly borne in two's in a loose raceme. Ovules in each cell 3.—Related to the entirely Old World group *Scilla* but altogether different, by virtue of the inflorescence, in aspect and further distinguishable by the 3-ovulate cells and the complanate filaments. The name commemorates the Peruvian botanist, Dr. Fortunato L. Herrera.

Fortunatia biflora (R. & P.) Macbr. Field Mus. Bot. 11: 9. 1931. *Scilla biflora* R. & P. Fl. 3: 69. *pl. 302.* 1802. *S. geminiflora* Kunth, Enum. 4: 325. 1843. *Ornithogalum biflorum* Don in Sweet, Brit. Fl. Gard. II. 4: *pl. 246.* 1834.

Plants 1–3 dm. high; flowers geminate, long-pediceled; bracts ovate, small.—A Chilean form with flowers in threes, doubtfully distinct, was found at Atiquipa by Raimondi (*S. triflora* Phil.). A loma plant.

Lima: Lurín, *5942.* Matucana, 2,400 meters, *213.* San Agustín, *Weberbauer 5236, 5237.* Chancai (*Ruiz & Pavón*).—Arequipa: Mollendo, *Weberbauer 1512.* Near Mejía, 50 meters (*Günther & Buchtien 349*), and Cachendo, 900 meters (*349a*).—Moquehua: Between Moquehua and Torata, 2,000 meters, *Weberbauer 7423.*

8. SMILAX [Tourn.] L.

Reference: DC. Monogr. 1: 1–217. 1878.

Well-known dioecious, often clambering plants with small umbellate flowers and 1–3-seeded, berry-like fruits.—The species

are imperfectly known and the following key, based of necessity largely on staminate material, is at best only suggestive. Many unnamed Peruvian fruiting specimens in herbaria are probably referable to the species here listed, but unassociated with flowering material, they are not surely determinable.

Leaves distinctly pubescent beneath or conspicuously mottled.
Leaves fulvous-tomentose.....*S. tomentosa.*
Leaves glabrous.....*S. argyrea.*
Leaves glabrous or essentially so, green throughout.
Umbels solitary, axillary on peduncles shorter than or barely as long as the petiole.
Leaves obtuse, acute, or acuminate but not caudately.
Branchlets smooth or nearly so.
Leaves rarely if ever over 1.5 dm. long.
Leaves thin and pellucid-punctate, even in age.
Leaves acute, under 1 dm. long.
Stems unarmed, smooth.....*S. cumanensis.*
Stems aculeate, tuberculate.....*S. vaga.*
Leaves acuminate, about 1.5 dm. long....*S. obliquata.*
Leaves firm and opaque, at least at maturity.
Flowers 4–7 mm. long.
Leaves obtusely or shortly acuminate..*S. floribunda.*
Leaves gradually acuminate.....*S. eucalyptifolia.*
Flowers 2–2.5 mm. long.
Petioles vaginate to the middle, tendril-bearing.
Branchlets purple-lineate.....*S. irrorata.*
Branchlets not at all lineate.....*S. Williamsi.*
Petioles vaginate at base, not, or tardily, tendril-bearing.....*S. colubrina.*
Leaves of the branchlets nearly 3 dm. long..*S. magnifolia.*
Branchlets conspicuously verruculose.....*S. bella.*
Leaves with a caudate acumen 5–7 mm. long.....*S. gilva.*
Umbels on peduncles longer than petioles, often more or less panicled or, if shortly peduncled, bracted or the subtending leaves poorly developed.
Flowering branchlets or peduncles tuberculate or minutely aculeate.

Leaves of flowering branchlets bractiform or poorly developed. *S. Schomburgkiana.*

Leaves all well developed.

Branchlets verruculose.....*S. insignis.*

Branchlets smooth, aculeate.....*S. obliquata.*

Flowering branchlets and peduncles smooth.

Branches and branchlets terete or subterete, not densely aculeate; pedicels in flower often shorter than 1 cm.

Flowers 2.5–4.5 mm. long, green or yellow-green; leaves thin, opaque only in age.....*S. Poeppigii.*

Flowers 5–7 mm. long, drying dark; leaves firm, opaque or subcoriaceous.

Leaves ovate-lanceolate or elliptic.....*S. Ruiziana.*

Leaves cordate-ovate.....*S. febrifuga.*

Branches and branchlets strongly angled, the oldest densely aculeate; pedicels often 12–20 mm. long...*S. papyracea.*

Smilax argyrea Lind. & Rod. Ill. Hort. 41: 12. 1894.

Leaves narrowly ovate-lanceolate, long-acuminate, deep green and conspicuously white-mottled.—Apparently unique or a sport, first recorded op. cit. 39: 51. 1892, again 40: 39. 1893, and illustrated as cited above; the two earlier references not seen by me.

Peru: Introduced into cultivation from Peru.

Smilax bella Macbr. Field Mus. Bot. 11: 47. 1931.

Stems markedly tuberculate-verruculose and slightly angled and aculeate, bearing remotely the handsome, almost rigid, heavy, acuminate leaves, these obscurely 5-nerved and laxly reticulate-veined, about 2.5 dm. long and 7.5–9 cm. wide; petioles 2 cm. long, shortly vaginate; female peduncles scarcely 5 mm. long, the pedicels shorter and the 50–60 green flowers much shorter (2 mm.), their segments linear-oblong.—An apparent ally of *S. cinnamomea* Desf., with the nerves deeply impressed above. *S. tuberculata* Presl, of Guayaquil, has very obtuse, usually aculeate leaves.

Loreto: Mishuyacu, *Klug 374*, type.

Smilax colubrina Macbr. Field Mus. Bot. 11: 45. 1931.

Stems smooth, slender, elineate; petioles 1–1.5 cm. long; leaves opaque, slightly lustrous, ovate-lanceolate, the margins undulate; the nerves 5, 3 subprominent only beneath, the reticulation lax;

male peduncles 3–5 mm. long, the pedicels as long, the white or yellow flowers about 25, with narrowly oblong segments; anthers much shorter than the filaments.

Loreto: Mishuyacu, *Klug 1327, 886, 867.*

Smilax cumanensis Willd. Sp. Pl. 4: 783. 1806; 118.

Stems unarmed, smooth, subterete or the branchlets subangulate; petioles 5–10 mm. long, narrowly vaginate for one-third to half their length; leaves ovate-oblong-lanceolate, 8–13 cm. long, 2–4.5 cm. wide, acuminate, mucronate, membranous, pellucid-punctate and lineate; male peduncles 2.5 mm. long; pedicels 4–10 mm. long; receptacles globose, 3 mm. thick; flowers 10–20, the segments oblong or ovate-oblong, 2 mm. long; anthers obtuse or mucronulate, much longer than the filaments; female inflorescence similar, the peduncle to 15 mm. long.—See also *S. gilva* and *S. colubrina*, referred here by Gleason. Neg. 10056.

Junín: San Nicolás, 1,100 meters, *Killip & Smith 26048* (det. Gleason). Extending to the Guianas.

Smilax eucalyptifolia Kunth, Enum. 5: 250. 1850; 97. *S. subinermis* Presl, Rel. Haenk. 1: 132. 1827, probably.

Unarmed; petioles 1–1.5 cm. long; leaves oblong-ovate-acuminate, 8–14 cm. long, 3–7 cm. wide, rigid, the nerves decurrent to the petiole; male peduncles 5–10 mm. long, 10–40-flowered; receptacle globose; bracteoles ovate-acuminate; flowers 3–4 mm. long(?), the female unknown; anthers apiculate; fruiting peduncles 3–5 mm. long, the pedicels 7–8 mm. long; fruit 6–10 mm. thick. Neg. 10059.

Cajamarca: Cutervo, *Raimondi.*—Huánuco: Prov. Huamalíes, *Weberbauer 3440, 3542.* Panao, *3612* (or near, det. Killip).—Without locality; *Ruiz.* "Purtrampui."

Smilax febrifuga Kunth, Enum. 5: 201. 1850; 158.

Stems, or branches below, stout, smooth and little striate, but aculeate, the branchlets rarely armed; petioles 2–3 cm. long; leaves broadly ovate, finally cordate, 9–23 cm. long, 6–17 cm. wide, opaque; peduncles 1.5–3 cm. long; bracts 12–15 mm. long, 3-lobed; male umbels 6–20-flowered; pedicels 8–9 mm. long; sepals 5–6 mm. long; anthers not apiculate; female umbels 5–10-flowered; pedicels 5–6 mm. long; fruit 14 mm. broad, on pedicels 10–12 mm. long. Neg. 10060.

Huánuco: Cochero and Posuso (*Pavón*). Huacachi, *4084* (or near, det. Killip). Posuso, *4685* (or near, det. Killip). Tingo María,

Raimondi.—Loreto: Tierra Blanca region, *Raimondi.* Río Itaya, *Williams 3392* (with young leaves). "Putrampui," "santo-palo."

Smilax floribunda Kunth, Enum. 5: 229. 1850; 97.

Similar to *S. eucalyptifolia,* but the leaves ovate-elliptic, cuspidate-acuminate, 5–7 cm. long and 3–5 cm. broad, only the broadest 9-nerved; umbels 8–40-flowered; sepals 5–7 mm. long; anthers obtuse; female flowers unknown. Neg. 10062.

Junín: Huacapistana, *Killip & Smith 2451.*—Cajamarca: Montaña de Nanchó, *Raimondi* (det. Krause).—Without locality, *Ruiz.* Ecuador. "Palo chico."

Smilax gilva Macbr. Field Mus. Bot. 11: 44. 1931.

A slender smooth terete-stemmed vine, the branchlets and leaves neither lineate nor punctate, the latter broadly or narrowly ovate and rather abruptly caudate, 10–12 cm. long, 3–3.5 cm. broad, on petioles 1 cm. long; nerves 3–5, obscure, the reticulation lax; male peduncles 3 mm. long; receptacles cylindric-globose, 4 mm. long; pedicels 6 mm. long; flowers greenish yellow and rose, drying sordid yellow, the obovate segments 4 mm. long; anthers obtuse, twice longer than the filaments.

Loreto: Mishuyacu, *Klug 874,* type.

Smilax insignis Kunth, Enum. 5: 200. 1850; 147.

Branchlets and peduncles verruculose; leaves ovate-oblong, acuminate, 5–12 cm. wide; peduncles 4, 1.5–2 cm. long; flowers unknown, apparently 18–20.—Here would key a specimen (by Esposto?) from mouth of the Pangao, referred in Herb. Dahlem to *S. papyracea.* It has, however, small male flowers, and in DeCandolle's treatment must rather be allied to species 80–84, from all of which its angled tuberculate stems, small (8–9 by 3–4 cm.) leaves, and elongate (3–4 cm.) peduncles separate it. Neg. 10064.

Puno: Carabaya, *Raimondi.*—Loreto: Río Acre, *Ule 9166.*—Without locality, *Ruiz.*

Smilax irrorata Mart. ex Griseb. in Mart. Fl. Bras. 3, pt. 1: 10. *pl. 2.* 1842; 134.

Stems and branches punctate and lineate with purple; petioles 5–10 mm. long; leaves ovate or ovate-oblong, 14 cm. long and 8 cm. broad, lustrous above, the broader 7-nerved; peduncles 3–12 mm. long, 6–15-flowered.—Williams has collected similar fruiting specimens from the region of Tarapoto, not clearly referable here

nor clearly distinct. *S. pseudosyphilitica* Kunth, op. cit. 188, and *S. syphilitica* Willd., both Amazonian, are to be expected. Their dull leaves are all 5-nerved. The petiole sheath of the latter is accrescent and obtusely lobed.

Loreto: Mainas (*Poeppig*).—San Martín: Tarapoto (*Spruce 4913*). Brazil.

Smilax magnifolia Macbr. Field Mus. Bot. 11: 46. 1931.

Moderately stout, the terete branches lightly striate but otherwise smooth; petioles 2.5 cm. long, vaginate at base, tardily tendril-bearing; leaves elongate-ovate, rounded at base, shortly acuminate, over 3 dm. long and over 1 dm. wide below, subcoriaceous, opaque, scarcely lustrous above, reticulate-veined, distinctly so only beneath, the 5 nerves indistinct; peduncles strongly compressed, 1 cm. long; receptacles oval, nearly 7 mm. long and 5 mm. wide; flowers and fruit unknown.—Perhaps nearest *S. phyllobola* Griseb., with smaller leaves, shorter peduncles, and globose receptacles.

Loreto: Mishuyacu, near Iquitos, *Klug 1000*, type.

Smilax obliquata Poir. Dict. 6: 469. 1804; 150.

Branches fleshy, nearly tetragonous, shortly aculeate; leaves unarmed, lanceolate-triangular, truncate at base or slightly cuneate to the petiole, long-acuminate, 5.5 cm. broad, thin, drying pale green; flowers and fruit unknown.

Peru: (*Jussieu*).

Smilax papyracea Poir. Dict. 6: 468. 1804; 150.

A coarse vine, the old stems inordinately aculeate, the younger remotely so and smooth but all strongly angled; petioles finally 2–3 cm. long, the leaves to 2 dm. long and more than a half as wide, but often smaller, even in age thin, rounded or lightly cordate at base, cuspidately acuminate; perianth segments strongly recurved, the staminate 6 mm. long.—Not recorded in Peru but no doubt occurring. According to Ducke, the roots of this species furnish probably all the sarsaparilla for export.

Brazil and Guianas. "Salsaparilha de Maranhao."

Smilax Poeppigii Kunth, Enum. 5: 192. 1850; 142.

Branchlets smooth or remotely aculeate; leaves ovate or elliptic, in age cordate and mucronulate, 1–2 dm. long and 6–13 cm. broad, 7-nerved, coriaceous, dull; peduncles 1–3 cm. long, 15–20-flowered; pedicels 7–15 mm. long; sepals 2.5–4 mm. long.—Probably *S.*

syphilitica of Poeppig in his *Reise*, with the native names "sarsa fina" and "sarsa gruesa." Neg. 10073.

Loreto: Mainas (*Poeppig 1916*). Mouth of Río Apaya, *Tessmann 3846*. Mouth of Río Santiago, *Tessmann 4081*. Mishuyacu, *Klug 38*. Iquitos and lower Río Huallaga, *Killip & Smith 29281, 29013*. Caballo-cocha, *Williams 2087*(?). Brazil. "Chicjasacha."

Smilax Ruizana Kunth, Enum. 5: 200. 1850; 158.

Near *S. febrifuga;* stems aculeate, especially near the leaves; leaves ovate-elliptic, the base obtuse but cuneate to the petiole; male peduncles 8–20 mm. long; bracts 5–7 mm. long.—*S. Spruceana* DC., to be expected, has obtuse anthers, the mature leaves are cordate at base, and the branches are somewhat verruculose. Neg. 10079.

Huánuco: Cochero and Pillao, *Ruiz.*

Smilax Schomburgkiana Kunth, Enum. 5: 187. 1850; 155.

Branches and branchlets terete or nearly so, more or less black-tuberculate, in our specimens smooth; petioles 1–1.5 cm. long; well-developed leaves ovate-lanceolate or oblong, acute at base, acuminate, finally 1.5–2.5 dm. long, 6–9 cm. broad, often much smaller; umbels many, pseudoracemose, often nearly subsessile; male flowers greenish yellow, 2 mm. long.—Our material is not surely referable here but otherwise it is nameless.

Loreto: Mishuyacu, near Iquitos, *Klug 213*. Santa Rosa, Yurimaguas, *Williams 4948*(?). Ranging to the Guianas.

Smilax tomentosa HBK. Nov. Gen. & Sp. 1: 272. 1816; 70.

In Peru the only densely pubescent species; leaves subtriplinerved at the middle, with 9 principal nerves.

Cajamarca: *Raimondi.*—Junín: Huacapistana, *Weberbauer 2101, 2165* (det. Krause). Colombia, Venezuela, and Central America.

Smilax Williamsi Macbr. Field Mus. Bot. 11: 46. 1931.

Very slender, the stems green, smooth, tortuous; leaves elliptic or ovate-elliptic, highly polished, beautifully net-veined, opaque, about 8 cm. long and 4 cm. broad, rounded at both ends; lateral nerves faint; petioles 7–10 mm. long, long-vaginate, tendril-bearing; young peduncles 3 mm. long, the receptacles globose, 3 mm. thick.—In sandy soil. Apparently as near *S. irrorata* Mart. as any species.

San Martín: Tarapoto, *Williams 5432*, type.

9. LUZURIAGA R. & P.

Woody plants with many small leaves and pendent flowers on bracteate axillary pedicels.—The generic name is conserved.

Luzuriaga radicans R. & P. Fl. 3: 66. *pl. 298.* 1802.

Flowers yellowish-white with red lines and dots; berries red.—Peru, according to Krause, on the basis of a Humboldt and also a Dombey specimen in Herb. Dahlem, purporting to come from Peru; but doubtful. The fruit is called "coral," and the Chilean names of the plant, according to Gay, are "esparto" and "quilinejo."

10. TOFIELDIA Huds.

Isidrogalvia R. & P. Fl. 3: 69. *pl. 302.* 1802.

Leaves densely rosulate at the base of the stems, the upper few and bract-like. Flowers rather crowded, in a spike-like raceme.

Tofieldia falcata (R. & P.) Pers. Syn. Pl. 1: 399. 1805. *Isidrogalvia falcata* R. & P. loc. cit. *T. flexuosa* Willd. Ges. Nat. Berl. Mag. 2: 28. 1808. *T. frigida* HBK. Nov. Gen. & Sp. 1: 267. 1816. *T. sessiliflora* Hook. Icon. Pl. 7: *pl. 691.* 1844.

Plants about 1 dm. high; flowers whitish or becoming purple-tinged, as the fruit.—Possibly more than one species is concerned.

Huánuco: Pillao (*Ruiz*). Mojón Cruz, Pacasmayo to Moyobamba, *Stuebel 23.* Vilcabamba, 1,800 meters, *5185.* Panao, 2,700 meters, *3606.*—Amazonas: Between Bagna and Chachapoyas, *Raimondi.* Chachapoyas, *Weberbauer 4284.* East of Huancabamba, *Weberbauer 6131.*

30. HAEMODORACEAE

Besides the following genus, there is in the Amazon region *Hagenbachia brasiliensis* Nees & Mart., distinguishable by its radical leaves and subsessile anthers, and *Schiekia orinocensis* (HBK.) Meisn., readily known by its somewhat woolly inflorescence. Both are further distinct from *Xiphidium* by the few seeds in each cell of the capsule.

1. XIPHIDIUM Aubl.

Perennials with iris-like equitant leaves and terminal panicles of regular, rather small flowers. Pedicels erect, bracteolate at base. Filaments and entire style filiform. Ovary free, with many ovules in each cell.—The genus is sometimes accredited to Loefling, Iter Hisp. 179. 1758, who actually treated it as a synonym of the

Iridaceous genus *Ixia* L. Its first valid publication appears to have been by Aublet.

Xiphidium album Willd. Sp. Pl. 1, pt. 1: 248. 1798.

Leaves 1–2 cm. broad; inflorescence yellowish-pubescent with crisped hairs; perianth segments narrow, whitish.—*X. caeruleum* Aubl., similar, has bluish flowers with broader segments. The inflorescence becomes long and open, with many red fruits.

Huánuco: Pampayacu, 1,000 meters, *Weberbauer 2322.* Posuso, *4636.*—Amazonas: Chachapoyas, *Weberbauer 4625;* 288.—Junín: Below Huacapistana, *Weberbauer;* 252. La Merced, *5558; Killip & Smith 23558.*—Loreto: Yurimaguas, *Ule 6309; Williams 7845.* Yarina-cocha, *Tessmann 3416.* Pinto-cocha, *Williams 794.* La Victoria, *Williams 2597.* Lower Río Nanay, Williams *419, 427.* Brazil.

31. AMARYLLIDACEAE Lindl. Amaryllis Family

Reference: Pax & K. Hoffmann, Pflanzenfam. ed. 2. 15a: 391–430. 1930.

No group of Peruvian plants has a single member more conspicuous or important than this family, for to it belongs the agave or "pacpa," seen everywhere in the middle hill country where it is grown as hedges to protect the steeply sloping chacras, and utilized as the source of "pita," each family often preparing its own supply of this useful fiber. Otherwise the importance of the Amaryllidaceae in Peru is largely horticultural, based upon the beauty of the blossoms. Numerous large-flowered plants of the amaryllis type are in cultivation, and the native species, particularly the climbing Bomareas, the Stenomessons, Urceolinas, Alstroemerias, and amancaes with their bell-shaped, brightly colored and variegated flowers, contribute to the beauty of the land. The blossoming of the last, especially, is the occasion for the spectacular festival, the Amancaise (cf. *Hymenocallis Amancaes*).

The tuberose (*Polianthes tuberosa* L.), a native of Mexico, with very fragrant, white flowers, is cultivated commonly for ornament. In Loreto and San Martín it is known by the name "margarita."

Scapes or stems leafy.

Leaves remote; inflorescence more or less umbellate.

Plants twining, with regular flowers.....1. *Bomarea.*

Plants not twining, the flowers irregular.....2. *Alstroemeria.*

Leaves crowded; inflorescence not umbellate.
Stamens exserted.....5. *Agave.*
Stamens included.....6. *Fourcroya.*
Scapes leafless (sometimes very short), or the leaves all near the base.
Plants grass-like, with long hairs.....3. *Hypoxis.*
Plants glabrous.
Flowers blue throughout.....4. *Distrepta.*
Flowers never blue throughout.
Flowers white or greenish white (in *Crinum*, with narrow segments, often red-flushed).
Stamen cup lacking or obscure.
Flowers very slender, with a very long tube..8. *Cooperia.*
Flowers funnelform.
Tube short.....7. *Zephyranthes.*
Tube about 1 dm. long.....15. *Hippeastrum.*
Tube about 2 dm. long.....11. *Crinum.*
Stamen cup conspicuous.
Leaves broad, petioled.....13. *Eucharis.*
Leaves narrow, sessile.....12. *Hymenocallis.*
Flowers variously colored but never white.
Flowers widely open, about 1 dm. (or more) across or, if smaller, with a conspicuous stamen cup.
Filaments attached to a large cup....12. *Hymenocallis.*
Filaments free, the cup lacking or obsolete. 15. *Hippeastrum.*
Flowers more or less tubular, funnelform, or urceolate.
Leaves slender (usually about linear), always sessile, or lacking at flowering time.
Stamen cup lacking; flowers solitary, sessile or nearly so.
Flowers solitary (or 2).
Filaments free; plants not crocus-like, or flowers whitish.....7. *Zephyranthes.*
Filaments short-connate at base; plants crocus-like, orange-flowered.....9. *Crocopsis.*
Flowers umbellate (1–4), bright yellow. 10. *Chlidanthus.*

Stamen cup present (rarely obscure); flowers more or less pediceled in umbels of 1 to several.

Filaments free, winged and toothed..19. *Eustephia.*

Filaments from the edge of the cup.14. *Stenomesson.*

Leaves broad and more or less petioled (cf. *Stenomesson*); stamen cup very short or obsolete.

Stamens little exserted.

Flowers more or less urceolate-dilated above. 16. *Urceolina.*

Flowers nearly cylindrical.....17. *Phaedranassa.*

Stamens long-exserted.....18. *Eucrosia.*

1. BOMAREA Mirb.

By Ellsworth P. Killip

Vines, often high-climbing with tortuose stems, in a few species erect or suberect herbs, the roots fibrous, sometimes bearing tubers; leaves alternate, short-petiolate, resupinate, sometimes reduced to scales on the lower part of the stem; inflorescence umbellate, rarely 1-flowered, simple or compound, usually subtended by bracts; perianth funnel-shaped, the tube none, the outer segments (sepals) prevailingly oblong, firm in texture, similar, the inner (petals) spatulate or unguiculate, rarely obovate, thinner than the sepals and equaling or exceeding them; stamens attached to base of segments, the filaments filiform, the anthers oblong, basifixed; fruit turbinate or subglobose, 3-celled (always?), 3-angled or obscurely 6-ribbed, dehiscent, indehiscent or at least very tardily dehiscent in a few species; seeds subglobose, usually with a pulpy testa.—*Collania* Herb., *Sphaerine* Herb., *Wichaurea* M. Roemer.

Bomareas are often a conspicuous feature of the higher mountains. The flowers are highly colored, and sometimes as many as 75 or 100 are massed in a single umbel.

Ovary partly superior, the base of the style being much enlarged and constituting more than half of the ovary; erect plants, often recurved at summit, the stem wand-like, the leaves linear, usually stiff and strongly revolute. (*Wichaurea.*)

Flowers averaging about 6.5 cm. long, green or cream-color, usually more than 6, in a compact head subtended by numerous long bracts which envelop the short rays and the lower part of the flowers.....1. *B. involucrosa.*

Flowers smaller (rarely 6 cm. long in *B. crocea*), the sepals red or pink, the petals yellowish.

Sepals broadly ovate, only about twice as long as broad. 2. *B. campanuliflora.*

Sepals oblong or linear-oblong, more than twice as long as broad.

Bractlets 4–5 cm. long; umbel rays stout, more than 10 cm. long; ovary rufo-tomentose.....3. *B. bracteata.*

Bractlets smaller; umbel rays slender, rarely more than 8 cm. long; ovary glabrous, usually glaucous.

Leaves pubescent on both surfaces.....4. *B. puberula.*

Leaves glabrous above.

Leaves distinctly revolute, often appearing acicular, 1–3 mm. wide when curled, often closely appressed to the stem; stem strongly recurved toward apex.

Sepals more than 4 cm. long, rounded or subtruncate, 1–1.5 cm. wide.....5. *B. Fiebrigiana.*

Sepals not more than 4 cm. long, subacute, less than 1 cm. wide.

Umbel rays more than 2 cm. long.

Leaves not more than 5 cm. long, rigid, puberulent beneath; umbel erect.....6. *B. porrecta.*

Leaves longer, rather lax, glabrous; umbel nodding. 7. *B. zosteraefolia.*

Umbel rays not more than 2 cm. long..8. *B. dulcis.*

Leaves flat or very slightly revolute, more than 3 mm. wide, at least the upper divaricate; stem often straight throughout.

Sepals linear-oblong, not more than 5 mm. wide; leaves puberulent beneath.....9. *B. petraea.*

Sepals oblong or lance-oblong, more than 5 mm. wide; leaves pilose or hirsutulous beneath.

Leaves averaging about 3 cm. long, subobtuse; umbel rays 1 or 2.....10. *B. uniflora.*

Leaves averaging much more than 3 cm. long, acuminate; umbel rays 3 or more.

Perianth less than 3 cm. long; leaf nerves hirsutulous beneath.....11. *B. phyllostachya.*

Perianth 4–6 cm. long; leaf nerves densely pilose beneath.....12. *B. crocea.*

Ovary wholly inferior, the style filiform, not enlarged at base; low, erect or suberect plants or elongate twining vines. (Ovary partly superior in species 44 and 45, which are twining vines.)

Fruit indehiscent (but always?); plants erect or suberect, decumbent in *B. pumila*. (*Sphaerine.*)

Inflorescence 1-flowered; plant very slender, decumbent, the leafy portion rarely more than 5 cm. long..13. *B. pumila.*

Inflorescence umbellate; plants stouter, the leafy portion much more than 5 cm. long.

Flowers more than 2 cm. long; bracts lanceolate, long-acuminate, persistent; under side of leaf nerves strongly flattened.....14. *B. secundifolia.*

Flowers rarely more than 2 cm. long; bracts often minute and soon deciduous; under side of leaf nerves not flattened.

Rays of umbel more than 10; sepals pubescent. 15. *B. nervosa.*

Rays of umbel less than 10; sepals glabrous.

Pedicels and ovary pubescent; ovary turbinate, broadest at apex.

Leaves linear-lanceolate, less than 5 mm. wide, subrevolute, glabrous.....16. *B. cruenta.*

Leaves ovate, more than 1 cm. wide, flat, pubescent beneath.....17. *B. coccinea.*

Pedicels and ovary glabrous; ovary ovoid, narrowed at apex.

Leaves prevailingly oblanceolate, broadest above middle; sepals corniculate; stem usually curved at apex.....18. *B. brevis.*

Leaves lanceolate or oblong-lanceolate, broadest at or below middle; sepals ecorniculate; stem straight. 19. *B. distichophylla.*

Fruit dehiscent; plants elongate twining vines, sometimes suberect herbs in *B. ovata*. (*Eubomarea.*)

Umbel rays simple, ebracteolate or with small, usually soon deciduous bractlets.

Pedicels and ovary glabrous (ovary puberulent in *B. rosea* but not viscous).

Sepals corniculate.....20. *B. cornigera.*

Sepals ecorniculate.

Leaves linear-lanceolate, not more than 5 mm. wide, slightly revolute, crowded toward top of stem. 21. *B. torta.*

Leaves lanceolate to ovate, much broader, flat, distant.

Perianth more than 4 cm. long; leaves densely tomentose beneath.....22. *B. Stuebelii.*

Perianth less than 4 cm. long; leaves glabrous, puberulent or strigillose.

Umbel rays less than 15, usually fewer than 10.

Ovary narrowly funnel-shaped, much broader than long, acute at base; leaves subcoriaceous. 23. *B. Klugii.*

Ovary globose-turbinate, nearly as broad as long, rounded at base; leaves thin-membranous. 51. *B. ovata.*

Umbel rays more than 15.

Leaves rufo-puberulent beneath; ovary puberulent; sepals dull red; petals red and green, purple-blotched.....24. *B. rosea.*

Leaves and ovary glabrous; sepals pink; petals yellow and green, purple-striped. 25. *B. anceps.*

Pedicels and ovary pubescent, usually viscous.

Stem densely hirsute with spreading moniliform hairs; leaves densely hirsute-tomentose beneath. 26. *B. aurantiaca.*

Stem and leaves glabrous or variously pubescent but not as above.

Leaves small, up to 4 cm. long and 1 cm. wide, linear-oblong.

Flowers solitary; leaves distant; stem filiform, glabrous.....27. *B. filicaulis.*

Flowers umbellate; leaves more crowded; stem coarser, pubescent.....28. *B. sclerophylla.*

Leaves larger, more than 4 cm. long, lanceolate or ovate-lanceolate.

Rays of umbel less than 7, most of them strongly recurved.

Anthers very large, about 5 mm. long; leaves less than 1 cm. wide; stem glabrous.
29. *B. macranthera.*

Anthers smaller; leaves at least 1 cm. wide; stem pilosulous.....30. *B. cernua.*

Rays of umbel more than 7, most of them erect.

Perianth not more than 3 cm. long.

Nerves of leaves strongly flattened beneath, usually less than 1 mm. apart.

Petals red; leaves membranous, long-acuminate, dark green above; inflorescence at length subracemose.....31. *B. purpurea.*

Petals yellow; leaves coriaceous or subcoriaceous, acute or subobtuse, yellow-green; inflorescence strictly umbellate.
32. *B. setacea.*

Nerves of leaves not flattened beneath, usually more than 1 mm. apart.

Sepals ecorniculate; inflorescence at length subracemose.

Leaves rufo-tomentose beneath; flowers usually more than 20..33. *B. densiflora.*

Leaves crispate-pilose on nerves beneath; flowers 10–15.....34. *B. denticulata.*

Sepals long-corniculate; inflorescence strictly umbellate.....35. *B. caudata.*

Perianth more than 3 cm. long.

Umbel rays less than 12, arcuate-ascending, 10–15 cm. long.....36. *B. crinita.*

Umbel rays 12 or more, straight or the outer recurved, less than 10 cm. long.

Under surface of leaves scaberulous; leaf nerves about 1 mm. apart.....37. *B. loreti.*

Under surface of leaves smooth; leaf nerves less than 1 mm. apart.

Leaves broadly lanceolate, more than 3 cm. wide.....38. *B. formosissima.*

Leaves narrower, not more than 2.5 cm. wide.

Perianth segments subequal, the petals not more than 2 mm. longer than the sepals, unspotted.....39. *B. superba.*

Perianth segments markedly unequal, the petals about 5 mm. longer than the sepals, densely spotted.
40. *B. sanguinea.*

Umbel rays forked, bearing a persistent bractlet at each fork.

Perianth less than 1.5 cm. long; leaves oblong, small, not more than 3.5 cm. long.....41. *B. nematocaulon.*

Perianth more than 1.5 cm. long (sometimes shorter in *B. campylophylla*); leaves longer (less than 3.5 cm. long in a few species but, if so, linear).

Leaves linear or narrowly linear-lanceolate, less than 6 mm. wide, revolute.

Bractlets linear-lanceolate, less than 2 mm. wide; leaves 8–10 cm. long.....42. *B. angustissima.*

Bractlets broadly lanceolate, more than 2 mm. wide; leaves less than 6 cm. long.

Leaves villous beneath; petals broadly dilated toward apex.....43. *B. Engleriana.*

Leaves glabrous; petals slightly dilated.

Umbel rays divaricate and much curved; stem glabrous or sparingly pubescent.44. *B. praeusta.*

Umbel rays erect or ascending; stem tomentose.
45. *B. parvifolia.*

Leaves lanceolate to ovate, more than 6 mm. wide, flat.

Petals and sepals subequal.

Leaves coriaceous, the nerves strongly elevated on both surfaces; bracts and bractlets falcate, the bractlets 4 cm. or more long. 46. *B. campylophylla.*

Leaves membranous, the nerves not strongly elevated; bracts and bractlets less than 4 cm. long.

Sepals corniculate, the horn 3 mm. or more long.
47. *B. cornuta.*

Sepals ecorniculate.

Bractlets suborbicular, complanate, the lowermost about 2.5 cm. wide.48. *B. ayavacensis.*

Bractlets not suborbicular and complanate, narrower.

Leaves puberulent beneath; umbel rays not more than 3 cm. long....49. *B. tarmensis.*

Leaves glabrous, or pilose beneath; umbel rays longer.

Bractlets minute or wanting, even the lowermost not more than 5 mm. long; umbel rays often unbranched; stem often suberect.

Umbel rays 20 or more, minutely rufo-pilosulous.....50. *B. amoena.*

Umbel rays less than 20, glabrescent. 51. *B. ovata.*

Bractlets larger, almost always present; rays predominately branched; stems voluble.

Leaves broadly ovate, more than 6 cm. wide.

Petals not spotted; leaves cordate. 52. *B. cordifolia.*

Petals spotted; leaves abruptly narrowed to petiole.....53. *B. latifolia.*

Leaves lanceolate or oblong-lanceolate, narrower.

Umbel compact, the rays more than 25, less than 6 cm. long. 54. *B. Hookeriana.*

Umbel diffuse, the rays fewer and much longer.

Flowers 2–3 cm. long; rays and ovaries glabrous.....55. *B. dolichocarpa.*

Flowers 4–5 cm. long; rays and ovaries pubescent.....56. *B. speciosa.*

Petals much longer than the sepals.

Umbel compact, the rays not more than 5 cm. long; flowers more than 2.5 cm. long....57. *B. lyncina.*

Umbel loose, the rays much more than 5 cm. long; flowers smaller.....58. *B. declinata.*

1. **Bomarea involucrosa** (Herb.) Baker, Journ. Bot. 20: 201. 1882. *Collania involucrosa* Herb. Amaryl. 103. *pl. 9.* 1837. *Wichaurea involucrosa* M. Roemer, Fam. Nat. Syn. 4: 278. 1847. *Alstroemeria Pavoniana* Beauverd, Bull. Soc. Bot. Genève II. 13: 176. *f. 12.* 1921.

Erect herb, with a stout wand-like stem 1–2 meters high, densely leafy throughout, usually recurved at summit; leaves linear or linear-lanceolate, up to 12 cm. long and 1.5 cm. wide (usually much narrower), slightly or strongly revolute, with sharp acicular tips, coriaceous, cano-pilosulous beneath; bracts ovate-lanceolate, about 2 cm. wide, completely concealing the very short, simple umbel rays; flowers up to 20, compact, the segments green, or cream-color tinged with green, not spotted, 5–7 cm. long, subacute, the sepals slightly unequal and the petals, also, slightly unequal; ovary deeply 3-grooved, glabrous.

Department uncertain: *Dombey 170; Gay 1613; Raimondi 8630; Maclean; Lobb 278; Martinet 1090.*—Lima: San Mateo, *Mathews 863* (type). Río Blanco, 3,200 meters, *Killip & Smith 21726, 2958.* Lima–La Oroya railroad, *Weberbauer 218, 1706.*—Junín: Acopalca Valley, Huancayo, 4,000 meters, *Ledig 1, 25.* La Oroya, *Kalenborn 5.* Tarma, *Ruiz & Pavón* (type of *Alstroemeria Pavoniana*).—Cuzco: Cuzco, 3,500 meters, *Herrera 269, 465, 530; Stafford 250.* Sacsahuamán, 3,600 meters, *Herrera 799.* Crapeza Valley, *Herrera 2680.* Río Tapfi, *Herrera 816, 856.* Santa Ana, *Herrera 566.*—Puno: Uco, *Raimondi 11265.* "Sulla-sulla."

2. **Bomarea campanuliflora** Killip, Journ. Wash. Acad. Sci. 25: 371. 1935.

Stem erect, recurved toward apex, glabrous; leaves linear, 3–9 cm. long, 3–6 mm. wide, crowded, strongly revolute, rigid, rufo-pilosulous beneath; umbel rays 4, about 4.5 cm. long, glabrous, once or twice forked, bracteolate; ovary broadly turbinate-campanulate, glabrous; sepals broadly ovate 2–2.5 cm. long, 1–1.5 cm. wide, red; petals oblanceolate-unguiculate, 2.5–3 cm. long, red, green-tipped.

Puno: Quebrada de Toipata, *Raimondi 10229* (type).

3. **Bomarea bracteata** (R. & P.) Herb. Amaryl. 112. 1837, as to synonymy only. *Alstroemeria bracteata* R. & P. Fl. 3: 61. *pl. 291, f. b.* 1802.

Stem slightly voluble, densely villous-tomentose; leaves linear-lanceolate, up to 6 cm. long and 1.2 cm. wide, flat, minutely pulverulent on both surfaces or glabrescent above; bracts slightly larger

than the leaves; umbel 4–6 rayed, the rays stout, 10–15 cm. long, once or twice forked above the middle; sepals oblong-lanceolate, 4–5 cm. long, 0.8 cm. wide, purplish, green-tipped; petals cuneate-unguiculate, 5–6 cm. long, green in the upper half, yellow at the base, the blade purple-dotted at the margin.

Ancash: Between Acas and Huauri, *Raimondi 12077*.—Junín: Huasahuasi, *Dombey 169; Ruiz & Pavón* (type).

4. **Bomarea puberula** (Herb.) Kränzl. Bot. Jahrb. 49: 132. 1913. *Collania puberula* Herb. Amaryl. 105. *pl. 11, f. 1.* 1837. *Wichaurea puberula* M. Roemer, Fam. Nat. Syn. 4: 279. 1847. *B. glaucescens* var. *puberula* Baker, Journ. Bot. 20: 201. 1882.

Erect herb 1–1.5 meters high, the stem densely rufo-tomentellous, recurved at the summit; leaves linear, up to 8 cm. long, 5 mm. wide, slightly or usually strongly revolute, coriaceous, rufo-tomentellous on both surfaces; inflorescence loosely flowered, subtended by oblong-lanceolate bracts up to 1 cm. wide, compound, the primary rays 3–4, once or twice forked, bearing large, persistent bractlets similar to the bracts; sepals oblong-lanceolate, 2–3.5 cm. long, red, green-tipped; petals spatulate-unguiculate, subequal to the sepals, about 1 cm. wide toward the apex, subacute, reddish yellow, green distally, purple-dotted at the upper margin.

Department uncertain: Andinamarca, *Mathews 1165*, in part (type).—Huánuco: *1824*. Also in Bolivia.

This is one of the few species of *Bomarea* with a conspicuous indument on both sides of the leaves, a character which, with the larger flowers and looser, conspicuously bracteolate inflorescence, distinguishes it from *B. dulcis*, with which it has been confused.

5. **Bomarea Fiebrigiana** Kränzl. Bot. Jahrb. 40: 230. 1908. *Collania Fiebrigiana* Kränzl. Bot. Jahrb. 50: Beibl. 111: 5. 1913.

Plant erect, usually recurved at the summit; leaves narrowly linear, up to 5 cm. long, 1–2 mm. wide, strongly revolute, appearing acicular, subappressed; bracts lanceolate, up to 4 cm. long, 1 cm. wide; flowers 4.5–5 cm. long, the segments subequal, 1–1.5 cm. wide; sepals oblanceolate, rounded or subtruncate at the apex, rose-color, tinged with greenish yellow, purple-spotted.

Cuzco: Alturas del Chaco, Santa Ana Valley, *Bües* (*Herrera 2120*). Type from Tarija, Bolivia.

6. **Bomarea porrecta** Killip, nom. nov. *Bomarea stricta* Kränzl. Ann. Nat. Hofm. Wien 27: 156. 1913, non Pax, 1889.

Stem erect, straight throughout, glabrous; leaves linear, 4–5 cm. long, 2–3 mm. wide, revolute, rigid, cano-puberulent beneath; umbel rays about 4.5 cm. long, once or twice forked; sepals ovate-oblong, about 1.8 cm. long, red; petals spatulate-unguiculate, slightly longer than the sepals, light yellow, greenish at the apex.

Peru (?): Locality uncertain, *Lobb* (type).

7. **Bomarea zosteraefolia** Killip, Journ. Wash. Acad. Sci. 25: 372. 1935.

Plant erect, rigid, 30 cm. high or more, glabrous throughout; leaves linear, 4–12 cm. long, 2–3 mm. wide, slightly revolute, membranous, divaricate; umbel rays about 6, 2.5–3 cm. long, slender, forked near the middle; sepals linear-oblong, about 2.5 cm. long and 6 mm. wide, red, green-tipped; petals oblong-spatulate, subequal to the sepals, yellowish(?), green-tinged and purple-maculate at the apex.

Ancash: *Martinet 742* (type).

8. **Bomarea dulcis** (Hook.) Beauverd, Bull. Soc. Bot. Genève II. 14: 172. 1922. *Alstroemeria dulcis* Hook. Bot. Misc. 2: 237. *pl. 95*. 1837. *Collania dulcis* Herb. Amaryl. 104. *pl. 7, f. 1–8*. 1837. *C. dulcis* var. *parvifolia* Herb. op. cit. 400. *pl. 46, f. 6*. *Wichaurea dulcis* M. Roemer, Fam. Nat. Syn. 4: 278. 1847. *W. dulcis* var. *Cruikshanksii* M. Roemer, loc. cit. *W. parvifolia* M. Roemer, op. cit. 279. *W. acicularis* M. Roemer, op. cit. 280. *Bomarea glaucescens* var. *dulcis* Baker, Amaryl. 147. 1888.

An erect, rigid herb 10–30 cm. high, the stem glabrous or short-tomentose, strongly recurved at the summit; leaves narrowly linear, up to 6 cm. long but usually much shorter, strongly revolute, appearing acicular, finely cano-puberulent beneath; primary rays 1–4, usually forked near the base, bearing at the fork a conspicuous, lanceolate bractlet; flowers 2–2.5 cm. long, the segments subequal, the sepals oblong, about 5 mm. wide, subacute, red, the petals spatulate, yellow, green-tipped or sometimes purple at the tip.

Department uncertain: *Née; Gay 2055*. Portachuelo, *Mathews* (type of *Collania dulcis* var. *parvifolia*).—Cajamarca: *Weberbauer 4026, 4235; Raimondi 391*.—Ancash: Yungai, *Weberbauer 3268*. Pichín, *Weberbauer 2948*. Huaraz, *Weberbauer 2967*.—Lima: Lima–La Oroya railroad, *Weberbauer 214*.—Junín: Cerro de Pasco, 4,000 meters, *Cruikshanks* (type; also type of *Wichaurea dulcis* var. *Cruikshanksii*); *Mathews*. Huarón, 4,200 meters, *1122*. La Oroya, *Kalenborn 161*.—Huancavelica: *Godet 85*.—Puno: Sandía, *Weber-*

bauer 965. Poto, *Stafford 45.* Moho, *Shepard 100.*—Arequipa: Arequipa, *Hopp 69.* Nevado de Chachani, *Pennell 13265, 13292.*—Moquehua: *Raimondi 11311.*—Cuzco: Cuzco, 3,600 meters, *Herrera 187, 817.* Crapeza Valley, *Herrera 2636, 2679.* "Mullupaycha," "habaya," "huaca-sulla."

9. **Bomarea petraea** Kränzl. Bot. Jahrb. 40: 229. 1908. *Collania petraea* Kränzl. Bot. Jahrb. 50: Beibl. 111: 5. 1913.

An erect herb up to 70 cm. high, the stem glabrous, densely leafy except in the lower part; leaves linear-lanceolate, up to 7 cm. long, 1 cm. wide, glabrous above, minutely grayish-puberulent beneath; bracts similar to the leaves, slightly smaller; primary umbel rays about 5, once or twice forked, the bractlets oblong, persistent; sepals linear-oblong, about 3 cm. long and 5 mm. wide, obscurely pellucid; petals linear-spatulate, subequal to the sepals, about 1 cm. wide.

Puno: Asángaro, 4,000 meters, *Weberbauer 476* (type); *Lechler 1777.* Also in western Bolivia at Lake Titicaca.

10. **Bomarea uniflora** (Mathews) Killip, Journ. Wash. Acad. Sci. 25: 372. 1935. *Alstroemeria uniflora* Mathews ex Herb. Amaryl. 104. 1837, as synonym. *Wichaurea dulcis* var. *uniflora* M. Roemer, Fam. Nat. Syn. 4: 278. 1847.

Stem erect or slightly curved, 30–60 cm. high, glabrous; leaves divaricate or somewhat ascending, linear-oblong, 2.5–3.5 cm. long, 4–6 mm. wide, subobtuse, scarcely revolute, densely crispate-pilosulous on the prominent nerves beneath; peduncles 1 or 2, 1–2-flowered, nearly 2 cm. long; sepals oblong, 2–2.2 cm. long, scarlet; petals cuneate-spatulate, subequal to or slightly longer than the sepals, yellowish(?), deep green at the upper margin.

Department uncertain: Huayllay, *Mathews 864* (type).—Ancash: Quebrada Cajavilca, *Savatier 1454.* Also in Bolivia.

11. **Bomarea phyllostachya** Mast. ex Baker, Amaryl. 143. 1888.

An erect plant 30–45 cm. high, the stem sparingly puberulent, leafy above the middle; leaves linear, 4–10 cm. long, 6–8 mm. wide, subrevolute, hirtellous on the nerves beneath; umbel rays 3–4, once or twice forked, bearing at the fork a large, persistent bractlet up to 7 cm. long and 8 mm. wide; sepals oblong, 2–2.2 cm. long, reddish; petals spatulate, subequal to the sepals, greenish yellow.

Peru(?): Locality uncertain, *Lobb* (type).—Huánuco: Mito, 2,800 meters, *1660*. The type locality is given as "Andes of Columbia" by Baker. Most of these Lobb "Colombia" collections were made in Peru or southern Ecuador.

12. **Bomarea crocea** (R. & P.) Herb. Amaryl. 119. 1837. *Alstroemeria crocea* R. & P. Fl. 3: 61. 1802. *Collania andimarcana* Herb. Amaryl. 105. *pl. 8, f. 1*. 1837. *Wichaurea andimarcana* M. Roemer, Fam. Nat. Syn. 4: 279. 1847. *Bomarea andimarcana* Baker, Journ. Bot. 20: 201. 1882. *Collania grandis* Kränzl. Bot. Jahrb. 50: Beibl. 111: 2. 1913.

An erect herb, up to 70 cm. high, the stem stout, recurved at the apex, glabrous or tomentose; leaves linear or linear-oblong, up to 12 cm. long, 4–8 mm. wide, glabrous above, densely pilose on the nerves beneath, divaricate; umbel rays 2–4, once or twice furcate, the bractlets lanceolate, persistent; perianth 3.5–6 cm. long, the segments subequal, the sepals oblanceolate, red or yellowish, green-tipped, the petals spatulate, yellow, green-tipped.

Department uncertain: *Maclean; Lobb* (type of *Collania grandis*, described from a plant grown in England). Andinamarca, *Mathews 1164* (type of *Collania andimarcana*).—Lima: Viso, 2,800 meters, *588*.—Junín: Churupallana, *Ruiz & Pavón* (type).—Cuzco: Lucumayo Valley, 3,600 meters, *Cook & Gilbert 1267*. "Chocllopa."

13. **Bomarea pumila** Griseb. ex Baker, Amaryl. 145. 1888.

A very slender plant with a prostrate, leafless, filiform stem, only the upper 4–5 cm. ascending and leafy; leaves ovate or obovate, 1–2.5 cm. long, up to 1.5 cm. wide, obtuse, glabrous; flowers solitary, the peduncles, ovary, and sepals hirsutulous with moniliform hairs, the peduncles slender, 1–1.5 cm. long, ebracteolate; ovary turbinate; sepals broadly ovate, about 1 cm. long, reddish; petals spatulate, subequal to the sepals, greenish yellow.

Cuzco: Sachapata, *Lechler 2240* (type). Alturas de Chaco, 3,000 meters, *Bües* (*Herrera 2151, 2162*).

This is the smallest *Bomarea* known and is easily recognized. *Bomarea pumila* and the six species which follow constitute a well-marked group, maintained by some authors as a separate genus, *Sphaerine*. The style is filiform throughout and is readily detached from the ovary. The ovary is slightly hexagonal, with obscure ribs marking the angles. In the few specimens with well-developed fruit which have been examined, the fruit appears always to be indehiscent, an observation made by Ruiz and Pavón.

14. **Bomarea secundifolia** (R. & P.) Baker, Journ. Bot. 20: 202. 1882. *Alstroemeria secundifolia* R. & P. Fl. 3: 60. *pl. 290, f. a.* 1802. *Sphaerine secundifolia* Herb. Amaryl. 107. *pl. 12, f. 1, 2.* 1837.

Plant about 60 cm. high, the stem nearly straight, terete, glabrous; leaves secund, lanceolate, 8–10 cm. long, 2.5–3 cm. wide, acuminate, rounded at the sessile base, dark green and glabrous above, very pale beneath with the nerves elevated but strongly flattened, hispidulous at the sides; bracts lanceolate, similar to the leaves, 3–3.5 cm. long, tapering to a slender point; umbel 4–6-rayed, the rays 2–3 cm. long, finely hirtellous, ebracteolate; ovary turbinate, densely tomentose; sepals linear-oblong, 2–3.5 cm. long, pilosulous without, yellow-red or purplish red; petals obovate-spatulate, subequal to the sepals, 5–6 mm. wide, yellow, green-tipped; capsule ovoid, hexagonal.

Cajamarca: *Jelski 8127.* Huánuco: Muña, *Ruiz & Pavón* (type). Vilcabamba, 1,800 meters, *4962.*

15. **Bomarea nervosa** (Herb.) Baker, Journ. Bot. 20: 202. 1882. *Sphaerine nervosa* Herb. Amaryl. 108. *pl. 13.* 1837.

An erect herb, leafy in the upper 30 cm., glabrous except the inflorescence; leaves lanceolate, 10–12 cm. long, 2–3 cm. wide, short-petioled, subdivaricate, strongly and closely nerved; outer bracts similar to the leaves but smaller, persistent, the inner setaceous; umbel simple, 10–25-rayed, the rays suberect, up to 3 cm. long, tomentulose, ebracteolate; ovary turbinate; sepals oblong-lanceolate, about 1.5 cm. long, puberulent without, red; petals spatulate, subequal to the sepals, about 6 mm. wide, yellow, green toward the apex.

Amazonas: Chachapoyas, 2,700–3,000 meters, *Mathews 1661* (type); *Williams 7574, 7581.*

16. **Bomarea cruenta** Kränzl. Bot. Jahrb. 40: 228. 1908.

A suberect plant 60–70 cm. high, the stem essentially glabrous, densely leafy in the upper half, the leaves reduced to distant scales in the lower half; leaves linear-lanceolate, up to 6 cm. long and 4 mm. wide, subrevolute, glabrous, erect or ascending; bracts linear, 1–1.5 cm. long, about 1 mm. wide; umbel simple, the rays about 4, 2–3 cm. long, fuscous-scabrid, ebracteolate; ovary obconic, scabrid; sepals obovate, 1–1.5 cm. long, red; petals spatulate, subequal to the sepals, up to 5 mm. wide, red without, orange within.

Amazonas: In sphagnum bog, east of Chachapoyas, 2,400–2,600 meters, *Weberbauer 4395* (type).

17. **Bomarea coccinea** (R. & P.) Baker, Journ. Bot. 20: 202. 1882. *Alstroemeria coccinea* R. & P. Fl. 3: 62. *pl. 291, f. a.* 1802. *Sphaerine coccinea* Herb. Amaryl. 108. *pl. 16, f. 1.* 1837.

Plant suberect, 30–50 cm. high, leafy only toward the summit, the leaves ovate, 4–5 cm. long, 1.5–2 cm. wide, subsessile, glabrous above, hirtellous on the nerves beneath with crispate hyaline hairs; bracts soon deciduous; umbel 2–4-rayed, the rays simple, up to 3 cm. long, ebracteolate, rufo-villosulous; ovary turbinate, densely-rufo-tomentose; sepals oblanceolate, 1.5–2 cm. long, red; petals spatulate, subequal to the sepals, reddish, purple-blotched within; fruit ovoid, about 1 cm. long, pubescent.

Huánuco: Muña, 2,500 meters, *4308*. Between Huánuco and Pampayacu, *Kanehira 88*, in part.—Junín: Huasahuasi, *Ruiz & Pavón* (type). Palca, *Weberbauer 2481*. Also in the mountains of western Bolivia.

18. **Bomarea brevis** (Herb.) Baker, Journ. Bot. 20: 202. 1882. *Sphaerine brevis* Herb. Amaryl. 108. *pl. 18, f. 1.* 1837. *Bomarea recurva* Baker, Amaryl. 145. 1888.

A suberect herb 30–50 cm. high, leafy only toward the summit, glabrous throughout, the stem often recurved at the end; leaves ovate, ovate-oblong, or oblanceolate, up to 8 cm. long, 3 cm. wide, acuminate or abruptly acute; bracts minute, soon deciduous; umbel 3–4-rayed, the rays simple, 3–4 cm. long, ebracteolate; ovary ovoid; sepals oblanceolate, 1–1.2 cm. long, reddish yellow, prominently horned dorsally just below the apex; petals spatulate, as long as the sepals, yellow, not marked; fruit ovoid, yellow.

Peru: Locality uncertain, *Mathews 1660* (type).—Huánuco: Cani, 2,700 meters, *3545*. Playapampa, 2,800 meters, *4872*. Yanano, 1,800 meters, *3773*. Panao, *2228*, *2229*. Between Huánuco and Pampayacu, *Kanehira* 88, in part.—Junín: Santiago, *Raimondi 1555*. Huacapistana, *Weberbauer 2074*.—Cuzco: Sachapata, *Lechler 2628* (type of *B. recurva*). Also in the mountains of western Bolivia.

19. **Bomarea distichophylla** (R. & P.) Baker, Journ. Bot. 20: 202. 1882. *Alstroemeria distichifolia* R. & P. Fl. 3: 60. *pl. 287, f. a.*(?) 1802. *Sphaerine distichophylla* Herb. Amaryl. 107. *pl. 12, f. 3, 4.* 1837.

An erect, glabrous herb 40–60 cm. high, the stem very straight, the leaves crowded, distichous, stiff, ascending or somewhat spreading, lanceolate or oblong-lanceolate, 6–10 cm. long, 1.5–2 cm. wide, prominently nerved; umbel 3–6-rayed, the rays simple, slender, up

to 2 cm. long, erect; flowers about 1 cm. long, the sepals and petals subequal; ovary ovoid; sepals narrowly oblong, bright red; petals spatulate, red or orange.

Huánuco: Chaclla, 2,800 meters, *3633*. Muña, 2,100 meters, *3893; Ruiz & Pavón* (type).—Junín: Río Masamerich, 2,700 meters, *Weberbauer 6634*.—Cuzco: Cerro de Cusilluyoc, 2,000–2,500 meters, *Pennell 13947*. Marcapata Valley, *Weberbauer 7865*. Also in the mountains of western Bolivia.

Ruiz and Pavón's illustration is evidently based upon specimens of both *B. setacea* and *B. distichophylla*, the larger flowers, the wider, divaricate or reflexed leaves, and the linear persistent bracts representing *B. setacea* and the subglobose, apparently indehiscent fruit *B. distichophylla*.

20. **Bomarea cornigera** Herb. Amaryl. 116. *pl. 17, f. 2, 3*. 1837.

A vine; stem slender, glabrous; leaves lance-ovate, 3–5 cm. long, 0.5–1.5 cm. wide, acute, glabrous; umbel 1–4-rayed, the rays about 3 cm. long, ebracteolate; sepals oblong, 2 cm. long, conspicuously horned, the horn about 3 mm. long; petals subequal to the sepals, about 7 mm. wide.

Peru(?): Locality uncertain, probably northern Peru, *Mathews 1659* (type).

21. **Bomarea torta** (HBK.) Herb. Amaryl. 115. 1837. *Alstroemeria torta* HBK. Nov. Gen. & Sp. 1: 283. 1816.

A vine, glabrous throughout; leaves linear-lanceolate, up to 4 cm. long and 5 mm. wide, acuminate, revolute, rigid, crowded toward the end of the stem; bracts numerous, similar to the leaves; umbel about 6-rayed, the rays about 1 cm. long, 1-flowered; sepals narrowly oblong-lanceolate, as long as the sepals, very slightly broader at the apex than the sepals, green, black-spotted, yellowish toward the base.

Cajamarca: Between Cajamarca and Páramo de Yanahuanga, 3,000 meters, *Humboldt & Bonpland* (type).—Amazonas: Chachapoyas, *Mathews*.—Without definite locality: *Raimondi 8584*.

22. **Bomarea Stuebelii** Pax, Bot. Jahrb. 11: 333. 1889.

A vine; stem glabrous; leaves narrowly elliptic or oblong, about 10 cm. long and 2.5 cm. wide, acuminate, narrowed at the base, glabrous above, densely pilose or tomentose beneath; bracts numerous, lanceolate; umbel 15–30-rayed, the rays 5–6 cm. long, ebracteolate, glabrous; ovary short-turbinate; sepals oblong, about 5 cm.

long, nearly 2 cm. wide, obtuse; petals spatulate, 4–5 cm. long, about 1.5 cm. wide at the apex.

Amazonas: Between Ventilla and Bagazán, 3,000 meters, *Stuebel* in 1875 (type). Chachapoyas, *Mathews*.—Junín: Río Mantaro, *Weberbauer 6563*.

23. **Bomarea Klugii** Killip, sp. nov.

Caulis volubilis, glaber; folia lanceolata vel oblongo-lanceolata, subcoriacea, valde nervata, in nervis hispido-hirtella; radii ca. 4, simplices, cum ovario minutissime puberuli; ovarium anguste obconicum; segmenta perianthii aequalia, rubra, sepalis oblongis, petalis spathulato-unguiculatis.

Herbaceous vine; stem slender, subangular, glabrous; petioles about 1 cm. long, finely pilosulous; leaves lanceolate or oblong-lanceolate, 7–15 cm. long, 1.5–2.5 cm. wide, long-acuminate, rounded at the base, subcoriaceous, glabrous above, hispid-hirtellous on the nerves beneath, prominently nerved, the nerves about 0.5 mm. apart, the cross veins numerous and also prominent; bracts membranous, reflexed, reddish, the outer 1 cm. long, the inner half as long; umbel simple, about 4-rayed, the rays slender, 3.5–4 cm. long; ovary narrowly obconic, tapering at the base, about 3 times as long as broad, the ovary and rays very minutely puberulent; perianth segments red, subequal, about 2 cm. long, the sepals oblong, 5–7 mm. wide, the petals spatulate-unguiculate, the blade about 4 mm. wide, much shorter than the claw, unspotted; stamens 1–1.2 cm. long.

Type in the U. S. National Herbarium, No. 1,457,816, collected at Zepelacio, near Moyobamba, Department of San Martín, Peru, in forest at 1,600 meters altitude, December, 1933, by G. Klug (No. 3410). Duplicates widely distributed.

This species is related to *B. rosea* and *B. anceps*, differing from these, and, indeed, from all other species of *Eubomarea* section *Multiflorae*, by the elongate ovary, which is similar to that of *B. dolichocarpa*, of a different section.

24. **Bomarea rosea** (R. & P.) Herb. Amaryl. 118. 1837. *Alstroemeria rosea* R. & P. Fl. 3: 61. 1802. *Alstroemeria fimbriata* R. & P. op. cit. *pl. 293, f. a*. *B. fimbriata* Herb. Amaryl. 116. 1837.

A vine; stem terete, glabrous; leaves ovate-lanceolate, 6–10 cm. long, 1.5–2.5 cm. wide, acuminate, glabrous above, densely and minutely rufo-puberulous beneath; bracts numerous, reflexed, unequal, linear or narrowly ovate-lanceolate; umbel 15–25-rayed, the rays very slender, often recurved at the apex, 3.5–4 cm. long,

glabrous; ovary usually finely rufo-puberulous when young, at length glabrous; sepals oblanceolate, 2–2.5 cm. long, 6–8 mm. wide, obtuse, deep red, tipped with dull purple; petals spatulate, as long as or slightly longer than the sepals, 9–10 mm. wide, red without toward the base, green above and purple-lined at the upper margin, green within, with large purple blotches.

Ancash: Andamayo, *Raimondi 1292.*—Huánuco: Yanano, 2,000 meters, *3657.* Muña, 2,300 meters, *3981.*—Junín: Huasahuasi, *Ruiz & Pavón* (type).

25. **Bomarea anceps** (R. & P.) Herb. Amaryl. 116. 1837. *Alstroemeria anceps* R. & P. Fl. 3: 61. 1802.

A vine, glabrous throughout; leaves lanceolate or the upper ovate-lanceolate, 5–10 cm. long, 1.5–2 cm. wide, acuminate; bracts ovate, up to 3.5 cm. long, reflexed; umbel 20–35-rayed, the rays slender, 2.5–5 cm. long, simple; ovary black, when dry much darker than the perianth; sepals oblanceolate, 2.2–2.5 cm. long, 6–7 mm. wide, obtuse, rich pink, (deep purple, *Ruiz & Pavón*); petals spatulate, subequal to or slightly longer than the sepals, 8–9 mm. wide, yellow in the lower half, green in the upper, purple-striped toward the upper margin.

Junín: Type collected by Ruiz and Pavón at Huasahuasi. Huacapistana 2,400 meters, *Killip & Smith 24500.* Carpapata, above Huacapistana, *Killip & Smith 24370.*

26. **Bomarea aurantiaca** Herb. Amaryl. 399. *pl. 46, f. 2.* 1837. *B. Macleanica* Herb. Bot. Reg. 28: Misc. 66. 1842. *B. Weberbaueriana* Kränzl. Bot. Jahrb. 40: 233. 1908.

A coarse vine; stem densely hirsute with spreading, moniliform, brownish hairs; leaves lanceolate-ovate, 6–15 cm. long, 2.5–5 cm. wide, abruptly acuminate, glabrous, streaked with reddish brown above, densely hirsute-tomentose beneath with brownish, crispate hairs; umbel 12–20-rayed, the rays stout, 4–5 cm. long, densely rufo-hirsutulous, viscid; bractlets wanting or soon deciduous; sepals broadly oblanceolate, 2.5–4 cm. long, 1–1.3 cm. wide, orange; petals spatulate, subequal to the sepals, about 1.5 cm. wide, orange.

Department uncertain: Panahuanca, *Mathews 1160* (type).—Ayacucho: Putis, Choimacota Valley, Province of Huanta, 3,400 meters, *Weberbauer 7528.*—Cuzco: Sandía, 2,900 meters, *Weberbauer 669* (type of *B. Weberbaueriana*).

This showy *Bomarea* is fairly common in Bolivia, but is known in Peru only from the type locality and from the eastern Andes adjacent

to Bolivia. The type of *B. Macleanica* was collected by J. Maclean, at Vitoc, Peru.

27. **Bomarea filicaulis** Kränzl. Bot. Jahrb. 40: 228. 1908.

A decumbent herb, the stem filiform, glabrous; leaves distant, oblong-lanceolate, 1–3 cm. long, 4–8 mm. wide, subcoriaceous, glabrous above, pilose beneath; flowers solitary, the peduncles scarcely 1 cm. long, pilose; ovary turbinate, pilose; sepals obovate-oblong, 1.8–2 cm. long, 4 mm. wide, red; petals spatulate-unguiculate, subequal to the sepals, up to 5 mm. wide, yellow, green toward the apex.

Huánuco: Monzón, 3,300–3,500 meters, *Weberbauer 3384* (type).

28. **Bomarea sclerophylla** Kränzl. Bot. Jahrb. 50: Beibl. 112: 6. 1913.

A slender, tortuous vine; stem pilosulous with dark hairs at the nodes, otherwise glabrous; leaves numerous, linear-oblong, 1.5–4 cm. long, 0.5–1 cm. wide, acute or subobtuse, subrevolute, thick-coriaceous, glabrous above, puberulous between the nerves beneath and short-pilose on the nerves; bracts narrowly lanceolate, deciduous; umbels 10–15-rayed, the rays up to 2 cm. long, viscid-villosulous; sepals obovate-oblong, 1–1.5 cm. long, red; petals broadly spatulate, subequal to the sepals, puberulous toward the base, red.

Huánuco: Monzón, Province of Huamalíes, 3,400 meters, *Weberbauer 3352* (type). Muña, 2,500 meters, *4307*. Playapampa, 2,800 meters, *4479*.

This may prove to be merely a robust form of the preceding, with the single flower developed into an umbel.

29. **Bomarea macranthera** Kränzl. Bot. Jahrb. 40: 230. 1908.

A vine; stem glabrous, leafy; leaves lanceolate, 5–6 cm. long, 6–8 mm. wide, sharply acuminate, glabrous above, pilose beneath; bracts linear, subpersistent; umbel simple, about 5-rayed, the rays 1.5–2 cm. long, densely fuscous-pilose like the ovary; sepals ligulate, up to 1.5 cm. long, 4 mm. wide, red; petals spatulate-unguiculate, subequal to the sepals, 6–7 mm. wide, orange, red at the apex; filaments short, about 4 mm. long; anthers about 5 mm. long.

Junín: Huacapistana, 3,000 meters, *Weberbauer 2201* (type).

30. **Bomarea cernua** Griseb. ex Baker, Amaryl. 149. 1888.

A vine, the stem slender, finely pilosulous; leaves lanceolate or oblong-lanceolate, 4–7 cm. long, 1–2 cm. wide, glabrous above,

pilosulous and glaucous beneath, membranous; bracts 3–5, similar to the leaves; umbel 3–6-rayed, the rays 2–4 cm. long, recurved, densely viscous-tomentellous, ebracteolate; ovary viscous-tomentulose; sepals oblanceolate-spatulate, about 2.5 cm. long, 4–5 mm. wide, red proximally, green distally; petals spatulate, 4–6 mm. wide, greenish yellow, sparingly dotted with dark red within, the midnerve red without.

Huánuco: Playapampa, 2,500 meters, *4477*.—Cuzco: Sachapata, *Lechler 2597* (type).

31. **Bomarea purpurea** (R. & P.) Herb. Amaryl. 118. 1837. *Alstroemeria purpurea* R. & P. Fl. 3: 63. *pl. 294, f. a.* 1802. *B. glomerata* var. *longifolia* M. Roemer, Fam. Nat. Syn. 4: 271. 1847. *B. endotrachys* Kränzl. Bot. Jahrb. 40: 234. 1908.

A vine; stem glabrous or usually rufo-tomentulose; leaves lanceolate, 5–12 cm. long, 1–4 cm. wide, long-acuminate, usually drying blackish above and pale beneath, the nerves strongly flattened beneath, glabrous, or hirtellous or scariose at the side; inflorescence with 25 or more flowers, the axis at length elongate, the pedicels and ovaries densely viscous-tomentose; perianth segments subequal, all deep red, the sepals narrowly oblanceolate, the petals cuneate-unguiculate.

Locality uncertain, *Mathews 1662*, in part (type of *B. glomerata* var. *longifolia*).—Amazonas: Between Tambo Almirante and Bagazán, 2,700 meters, *Weberbauer 4431* (type of *B. endotrachys*). Moyobamba, *Stuebel 25e*.—Huánuco: Pillao, *Ruiz & Pavón* (type). Tambo de Vaca, 3,700 meters, *4443*. Yanano, 1,800 meters *3665*. Also in Colombia and Ecuador.

32. **Bomarea setacea** (R. & P.) Herb. Amaryl. 117. 1837. *Alstroemeria setacea* R. & P. Fl. 3: 62. *pl. 292, f. b.* 1802. *B. glomerata* Herb. op. cit. 115. *pl. 15, f. 1.* *B. tomentosa* var. *pangoensis* Herb. op. cit. 118.

A vine; stem subterete, sparingly villosulous, at length glabrous; leaves lanceolate or oblong-lanceolate, 4–8 cm. long, 1–1.5 cm. wide, acute, rounded at the base, closely nerved, coriaceous, glabrous above, short-pubescent on the nerves beneath; bracts linear-lanceolate to setaceous, up to 2 mm. wide, reflexed or suberect, deciduous; umbel 15–40-rayed, the rays slender, up to 2.5 cm. long, densely viscous-tomentose, bearing near the middle a single setaceous, eventually deciduous bractlet about 5 mm. long; flowers 1–1.5 cm. long, the sepals and petals subequal; sepals linear-oblong, 3–4 mm.

wide, red or yellowish red; petals spatulate, 4–5 mm. wide, red, shading yellowish toward the margin.

Department uncertain: *Mathews 1662*, in part (type of *B. glomerata*); *Lobb 27, 256; Dombey 164.* "Prov. de Carabaya," *Weddell 4686, 9897.*—Cajamarca, Huancabamba, *Weberbauer 6106.*—Huánuco: Pillao, *Ruiz & Pavón* (type). Río Chinchao, 1,800 meters, *5169.* Panao, 3,100 meters, *2216.* Huánuco, *Weberbauer 3352.* Monzón, *Weberbauer 3380.* Posuso, *Raimondi 10369.* Pampayacu, *Sawada P39; Kanehira 105.*—Junín: Pangoa, *Mathews 1162*, in part (type of *B. tomentosa* var. *pangoensis*). Curupallana, *Ruiz & Pavón.*—Cuzco: Cerro de Cusilluyoc, 2,800 meters, *Pennell 14102.* Paucartambo Valley, *Herrera 3336.*—Puno: Sandía, *Weberbauer 1099, 1335.* Also in southern Ecuador.

33. **Bomarea densiflora** Herb. Amaryl. 399. *pl. 46, f. 4.* 1837. (*?*) *Bomarea tomentosa* var. *ebracteata* Herb. op. cit. 118.

A vine; stem pubescent toward the apex, otherwise glabrous, stout; leaves sparse, ovate, 8–10 cm. long, 3–5 cm. wide, rufo-tomentose beneath, the nerves elevated beneath; inflorescence at length subracemose, the pedicels 20 or more, 2.5–3 cm. long, densely tomentulose, bearing a subulate bractlet near the base; perianth segments subequal, 2–2.5 cm. long, deep red, the sepals oblanceolate, the petals spatulate.

Department uncertain: *Mathews 1666* (type of *B. tomentosa* var. *ebracteata*, doubtfully referred here as the leaves are proportionately much narrower).—Amazonas: Chachapoyas, *Mathews 1667* (type). Also in Ecuador.

34. **Bomarea denticulata** (R. & P.) Herb. Amaryl. 118. 1837. *Alstroemeria denticulata* R. & P. Fl. 3: 62. *pl. 293, f. b.* 1802.

A vine; stem fulvo-tomentose toward the apex, otherwise glabrous; leaves ovate, 5–9 cm. long, 2–4 cm. wide, entire, crispate-pilose with hyaline hairs on the elevated nerves beneath; inflorescence at length subracemose, the pedicels 10–15, up to 5 cm. long, rufo-tomentose, bracteolate near the base; perianth segments subequal, 2–2.5 cm. long, deep rich red, the sepals oblanceolate, the petals oblanceolate-spatulate.

Department uncertain: Patasaria, *Ruiz & Pavón* (type).—Huánuco: Vilcabamba, Río Chinchao, 2,800 meters, *4965.*

In the type specimen the margin of the leaves is slightly callous-thickened and subrevolute. In drying, the "overflow" has projected beyond the rest of the margin so that, when viewed from above,

the leaves have a denticulate appearance. A similar condition in a specimen of Lehmann's from Colombia has given rise to an article on the identity of *Bomarea denticulata* by Kränzlin.

35. **Bomarea caudata** Killip, Journ. Wash. Acad. Sci. 22: 59. 1932.

A vine; stem subangular, tortuous, glabrous; leaves oblong-lanceolate, 7–10 cm. long, 2.5–3.5 cm. wide, subabruptly acuminate, rounded at the base, glabrous above, sparingly hirsute with long crispate hairs on the principal nerves beneath, the nerves about 1 mm. apart, unequally prominent; bracts lanceolate, 1.5 cm. long, 6 mm. wide, the inner setaceous; umbel 18-rayed, the rays 2.5–3 cm. long, densely rufo-tomentose, ebracteolate; sepals oblanceolate, about 2 cm. long, 7–8 mm. wide, blood-red, dorsally corniculate near the apex, the horn slender, 5–6 mm. long; petals spatulate, subequal to the sepals, 5–6 mm. wide, green, brown-spotted.

Ayacucho: Choimacota Valley, Province of Huanta, 2,800 meters, *Weberbauer 7559* (type).

36. **Bomarea crinita** Herb. Amaryl. 119. *pl. 15, f. 4.* 1837.

A vine; stem terete, finely and softly tomentellous; leaves lanceolate, 7–11 cm. long, 1.5–2 cm. wide, subacute at the base, closely nerved with the cross veins prominent, glabrous above, glaucous and sparingly pubescent beneath, rigid; bracts similar to the leaves, about 6 cm. long, subreflexed; umbel 6–10-rayed, the rays 10–15 cm. long, densely pubescent, ebracteolate; sepals lanceolate-spatulate, 4–5 cm. long, 6–8 mm. wide, red, orange at the margin; petals oblanceolate-spatulate, slightly longer than the sepals, 10–14 mm. wide, narrowed at the apex, red, orange at margin.

"Andes of Peru," *Mathews 1664* (type).—Amazonas: East of Chachapoyas, *Weberbauer 4422.*

37. **Bomarea loreti** Kränzl. Bot. Jahrb. 50: Beibl. 111: 4. 1913.

A vine; stem angulate, glabrous; petioles about 1 cm. long; leaves ovate-lanceolate, up to 12 cm. long, 2–2.5 cm. wide, acuminate, glabrous above, minutely scaberulous beneath, the nerves 1 mm. apart; bracts numerous, lanceolate, about 1.5 cm. long, reflexed; umbel 20–25-rayed, the rays 2.5 cm. long, pilosulous; ovary densely pilose; sepals oblanceolate, 3.3–3.5 cm. long, narrowed at the apex, pilosulous without; petals cuneate-spatulate, slightly longer than the sepals, about 1 cm. wide, rounded or subtruncate and crenulate at the apex.

Loreto: Cerro de Ponasa, 1,300 meters, *Ule 46* (type).

38. **Bomarea formosissima** (R. & P.) Herb. Amaryl. 111. *pl. 14, f. 4.* 1837. *Alstroemeria formosissima* R. & P. Fl. 3: 64. *pl. 296.* 1802.

A vine; stem stout, glabrous; leaves broadly lanceolate, 10–25 cm. long, 3.5–6 cm. wide, acuminate, abruptly tapering at the base to a winged petiole, glabrous; bracts lanceolate, up to 3 cm. long, the inner linear-lanceolate; umbel up to 80-rayed, the rays 3–5 cm. long, densely rufo-tomentose, ebracteolate; sepals oblanceolate, 3–4 cm. long, 7–10 mm. wide, obtuse or slightly narrowed at the apex, rufo-puberulous, red, purplish red at the apex; petals spatulate, equal to or slightly longer than the sepals, 1.5–2 cm. wide, yellow, densely spotted.

Peru(?): Locality uncertain, *Lobb 258.*—Huánuco: Muña, *Ruiz & Pavón* (type); *4313; Pearce 214.*—Ayacucho: Province of Huanta, *Weberbauer 5655.*

Ruiz and Pavón give the local name of this as "sumac-huaita," meaning a most showy flower. This is one of the most gorgeous of Peruvian Bomareas.

39. **Bomarea superba** Herb. Amaryl. 117. *pl. 6, f. 1.* 1837.

A vine with a stout, angular, glabrous stem; leaves lanceolate, up to 12 cm. long and 2 cm. wide, rigid, glabrous, closely nerved; bracts numerous, crowded, reflexed, lanceolate, up to 6 cm. long and 1.5 cm. wide; umbel about 12–rayed, the rays up to 4 cm. long, ebracteolate, rufo-tomentulose; ovary short-turbinate, rufo-tomentulose; sepals oblanceolate, 3–3.5 cm. long, 8–9 mm. wide, red; petals broadly spatulate, subequal to the sepals, about 1 cm. wide, orange (?), not spotted.

Locality uncertain: *Mathews 1663* (type).

40. **Bomarea sanguinea** Kränzl. Bot. Jahrb. 50: Beibl. 112: 6. 1913. (?) *B. subglobosa* Herb. Bot. Reg. 28: Misc. 66. 1842. (?) *B. fimbriata* var. *paltarumensis* Herb. Amaryl. 116. 1837.

A vine with a stout, glabrous, angular or subterete stem climbing to 6 meters or more; leaves lanceolate, up to 20 cm. long and 2.5 cm. wide, long-acuminate, tapering at the base to a narrowly winged petiole, closely nerved, glabrous; bracts dissimilar, the outer lanceolate, about 4 cm. long, reflexed, persistent, the inner linear, erect, deciduous; umbel up to 35-rayed, the rays 2–4 cm. long, ebracteolate, densely viscid-tomentulose; ovary turbinate, pubescent as the rays; sepals obovate-oblong, averaging 3.5 cm. long, 8–9 mm. wide,

reddish yellow to "ox-blood red"; petals spatulate, averaging 4 cm. long, 1.5–2 cm. wide at the apex, minutely crenulate at the upper margin, yellow, shading to dull red at the margin, spotted with dark red.

Department uncertain: Agapata, *Lechler 2141*.—Huánuco: Mito 2,800 meters, *1666*. Huánuco, 3,200 meters, *2123*.—Cuzco: *Weddell, 4766*. Urubamba, 3,400 meters, *Weberbauer 4918* (type); *Herrera 805*. Machupicchu, 2,100 meters, *Cook & Gilbert 845*. Lucumayo Valley, *Cook & Gilbert 1313*. Lares Valley, 2,900 meters, *Herrera 827*. Also in western Bolivia.

This species has been confused with both *B. superba* and *B. formosissima*. It is known as "pachanca" in Huánuco and "sullo-sullo" in Cuzco.

41. **Bomarea nematocaulon** Killip, Journ. Wash. Acad. Sci. 22: 60. 1932.

A vine; stem slender, wiry, subterete, glabrous, glandular-puberulent at the tip, leafy throughout; leaves narrowly oblong or lanceolate-oblong, 1.5–3.5 cm. long, 0.4–1 cm. wide, subacute and callous-thickened at the apex, rounded or rarely subacute at the base, slightly revolute, coriaceous, glabrous and sublustrous above, strigillose with crispate hyaline hairs on the nerves beneath; bracts 3–4, similar to the leaves; umbel 2–3-rayed, the rays up to 4 cm. long, glandular-puberulent, once or twice forked, bearing at the forks a single linear-lanceolate bractlet 5–8 mm. long; ovary glandular-puberulent; sepals oblanceolate, 10 mm. long, 5 mm. wide, yellowish red; petals unguiculate, equal to the sepals, 4 mm. wide at the widest point, yellow, purple-blotched distally.

Huánuco: Playapampa, 2,800 meters, *4870* (type).

This species is obviously related to *B. Salsilla*, a common plant of Chile. The small, thick leaves and the small flowers suggest *B. sclerophylla*, which has a simple umbel and glabrous leaves.

42. **Bomarea angustissima** Killip, Journ. Wash. Acad. Sci. 22: 60. 1932.

A vine; stem subterete, glabrous; leaves linear, 8–10 cm. long, 3–5 mm. wide, caudate-acuminate and twisted at the apex, subsessile, strongly revolute, glabrous above, finely pilosulous on the nerves beneath; bracts similar to the leaves, up to 1.5 cm. long; umbel 3-rayed, the rays 12–15 cm. long, arcuate-ascending, glabrous, once or twice forked, bracteolate at the forks, the bractlets linear-lanceolate, 5–10 mm. long; ovary glabrous; sepals oblanceolate, about 1.8

cm. long, 7–8 mm. wide, proximally deep red, distally green; petals unguiculate, as long as the sepals, about 1 cm. wide at the apex, green, purple-blotched within.

Huánuco: Tambo de Vaca, 4,000 meters, *4409* (type).

43. **Bomarea Engleriana** Kränzl. Bot. Jahrb. 40: 231. 1908.

A vine; leaves narrowly linear-lanceolate, 3–3.5 cm. long, 2–3 mm. wide, acute, revolute, coriaceous, glabrous above, villous beneath; bracts oblong and lanceolate, up to 4 cm. long and 1 cm. wide; umbel 4–6-rayed, the rays filiform, up to 6 cm. long, glabrous, once furcate, bearing at the fork a single oblong-lanceolate bractlet similar to and slightly smaller than the bracts; sepals obovate-oblong, about 2 cm. long, apiculate; petals oblong-spatulate, slightly shorter than the sepals, 1–1.2 cm. wide.

Huánuco: Monzón, Province of Huamalíes, 3,500–3,700 meters, *Weberbauer 3307* (type).

44. **Bomarea praeusta** Kränzl. Ann. Nat. Hofm. Wien 27: 155. 1913. *Collania nutans* Herb. in Baker, Amaryl. 147. 1888, as synonym.

A vine; stem wiry, very leafy, sparsely pilosulous toward the apex, otherwise glabrous; leaves narrowly linear, 2.5–5 cm. long, 2.5–3.5 mm. wide, sessile, revolute or subrevolute, glabrous; umbel rays 2–10, 2–3-forked, 4–5 cm. long including the forks, divaricate and strongly curved, glabrous, the bractlets linear-lanceolate, broader than the leaves; ovary partly superior; perianth segments subequal, 2–2.5 cm. long, the sepals linear-lanceolate, red, the petals spatulate-unguiculate, apparently yellow, deep purple at the upper margin; anthers often exserted.

Locality uncertain: *Lobb* (type; from Peru?); *Maclean; Mathews; Raimondi 8584.*—Arequipa: *Stafford 370.*

This species and the following connect the subgenera *Wichaurea* and *Eubomarea*, having the floral characters of the former but the strongly voluble stems of the latter.

45. **Bomarea parvifolia** Baker, Amaryl. 154. 1888.

A vine; stem stout, tomentose; leaves linear, 2.5–4 cm. long, 4–5 mm. wide, sessile, glabrous; bracts similar to the leaves, numerous; umbel 10–12-rayed, the rays ascending, 9–10 cm. long, stout, once or usually twice furcate, bracteolate at the forks, the bractlets linear-lanceolate, subequal to the bracts; perianth segments bright pink,

subequal, about 3 cm. long, 3–5 mm. wide, the petals only slightly broader than the sepals, dark purple at the tip.

Huantanga, *Maclean* (type).

46. **Bomarea campylophylla** Killip, Journ. Wash. Acad. Sci. 25: 374. 1935.

A vine; stem glabrous; leaves linear-lanceolate or narrowly oblong-lanceolate, 6–12 cm. long, 1–1.5 cm. wide, subfalcate, rounded at the base, strongly and closely nerved, glabrous, concolorous; bracts similar to the leaves, 7–10 cm. long, 5–8 mm. wide; umbel 5–6-rayed, the rays 10–15 cm. long, divaricate or arcuate-ascending, rufo-puberulent and viscid at the apex, otherwise glabrous, forked near the apex, 2-flowered, bracteolate at the fork and sometimes just below the fork, the lower bractlets similar to the bracts, 4–5 cm. long; ovary rufo-tomentose; sepals oblong, about 1.5 cm. long, 7–8 mm. wide, red and rufo-puberulent without, yellow within, green at the apex; petals spatulate, slightly shorter and narrower than the sepals, yellow and purple-maculate proximally, green distally.

Huánuco: Vilcabamba, Río Chinchao, 1,800 meters, *4961* (type).

47. **Bomarea cornuta** Herb. Amaryl. 114. *pl. 17, f. 4.* 1837. *B. edulis* var. *cornuta* Baker, Amaryl. 154. 1888.

A vine; stem glabrous; leaves lanceolate or ovate-lanceolate, up to 15 cm. long and 3.5 cm. wide, tapering to a long, slender apex, rounded at the base, membranous, glabrous above, strigillose on the nerves beneath with spreading, curved hairs; bracts lanceolate, up to 2 cm. long, deciduous; umbel 3–5-rayed, the rays 15–25 cm. long, glabrous or sparingly rufo-pilosulous at the ends, 3–4 times furcate, bracteolate at the forks, the bractlets up to 1 cm. long; sepals about 2 cm. long, red, green-tipped, puberulent without, horned dorsally just below the apex, the horn 5–7 mm. long; petals spatulate, about as long as the sepals, 7–8 mm. wide.

Huánuco: Huacachi, near Muña, 2,100 meters, *4112*. Between Huánuco and Pampayacu, 2,800 meters, *Kanehira 252, 285*.— Department uncertain: Mount Parahuanca, *Mathews 1161* (type).

48. **Bomarea ayavacensis** Kränzl. Bot. Jahrb. 54: Beibl. 117: 2. 1916.

A vine, glabrous throughout; leaves oblong-lanceolate, 6–9 cm. long, 2–2.5 cm. wide, acuminate, membranous, glaucescent beneath; bracts broadly oblong, about 4 cm. long; umbel 3-rayed, the rays up

to 12 cm. long, furcate near the middle and bearing at the fork a large, suborbicular, convolute bractlet about 3 cm. long and broad; sepals oblong, about 2.5 cm. long, 8–10 mm. wide, rose, green distally; petals spatulate-obovate, as long as or slightly shorter than the sepals, pale green, spotted with brown.

Piura: Above Ayavaca, 2,900 meters, *Weberbauer 6373* (type).

49. **Bomarea tarmensis** Kränzl. Bot. Jahrb. 40: 233. 1908.

Plant subscandent, the stem straighter than in most species of this relationship, finely and sparsely or densely pilosulous; leaves lanceolate, up to 20 cm. long and 2 cm. wide, thin-membranous, glabrous and bright green above, very short-pilosulous or subpuberulent and glaucous beneath, the leaves reduced toward the apex; bracts oblong-lanceolate, up to 3 cm. long, soon deciduous; umbel densely flowered, the rays 2–3 cm. long, cano-pilosulous, the primary rays 12–18, usually once furcate, bearing a lanceolate bractlet 5–7 mm. long; sepals 1.5–2 cm. long, 8–10 mm. wide, concave, orange-yellow; petals unguiculate, about as long as the sepals, 4–6 mm. wide, orange-yellow, green-tinged and dotted with red or purple near the apex.

Huánuco: Cueva Grande near Posuso, 1,100 meters, *4780*. Junín: La Merced, 700–1,000 meters, *Weberbauer 1846* (type).—Ayacucho: Kimpitiriki, Apurímac Valley, 400 meters, *Killip & Smith 22858, 22936, 22992*.

50. **Bomarea amoena** (Herb.) M. Roemer, Fam. Nat. Syn. 4: 274. 1847. *B. purpurea* var. *amoena* Herb. Amaryl. 399. *pl. 46, f. 5*. 1837. *B. purpurea* var. *guancana* Herb. op. cit. 399.

A vine; stem glabrous; leaves oblong-lanceolate, 8–15 cm. long, 1.5–3 cm. wide, pale and crispate-pilose beneath; umbel rays 20–30, 4–8 cm. long, divaricate, rufo-pilosulous, simple or forked, the bractlets up to 5 mm. long; ovary rufo-pilosulous; perianth segments subequal, 2–2.5 cm. long, the sepals oblanceolate, red, the petals cuneate-unguiculate, yellowish, green-tinged toward the apex.

Department uncertain: *Gay 992*. Guancas, *Mathews 1665* (type of *B. purpurea* var. *guancana*).—Amazonas: Chachapoyas, *Mathews* (type).

51. **Bomarea ovata** (Cav.) Mirb. Hist. Nat. Pl. 9: 72. 1804. *Alstroemeria ovata* Cav. Icon. Pl. 1: 54. *pl. 76*. 1791. (?) *A. tomentosa* R. & P. Fl. 3: 62. *pl. 292, f. a*. 1802. *A. macrocarpa* R. & P. op. cit. 63. *pl. 294, f. b*. *B. ovata* var. *Cavanillesiana* Herb. Amaryl. 113.

1837. *B. macrocarpa* Herb. op. cit. 114. (?) *B. tomentosa* Herb. op. cit. 117. *B. simplex* Herb. op. cit. 119. *pl. 15, f. 5.* *B. punctata* Herb. Bot. Reg. 28: Misc. 66. 1842. *B. variabilis* Herb. loc. cit. *B. variabilis* var. *simplex* Herb. op. cit. 67. *B. edulis* var. *ovata* Baker, Amaryl. 154. 1888. *B. tribrachiata* Kränzl. Bot. Jahrb. 40: 235. 1908.

A suberect, trailing, or subscandent, tuber-bearing herb; stem slender, glabrous; leaves ovate or ovate-lanceolate, up to 12 cm. long and 4 cm. wide, averaging about 5 cm. by 2.5 cm., gradually or abruptly acuminate, membranous, glabrous above, sparsely crispate-strigillose on the nerves beneath; bracts similar to the leaves, usually much reduced, deciduous; umbel rays 2–7, simple or once furcate, bearing at the forks small, deciduous bractlets up to 5 mm. long; ovary sparingly puberulent, at length glabrous; sepals oblong or ovate-oblong, 2–3 cm. long, 5–7 mm. wide, pink or reddish, green-tipped; petals subequal to the sepals, rarely slightly longer, usually narrower, green, purple-dotted; fruit about 1.5 cm. in diameter.

Department uncertain: Type, from a cultivated plant at Madrid, said to have been of Peruvian origin. *Dombey 172; Martinet 207, 494; Gay 2018; Mathews* (type of *B. punctata*). "Southern Peru," *Weddell.* Puruchuco, *Mathews 483, 786* (type of *B. simplex* and *B. variabilis*).—Cajamarca: Huambos, *Weberbauer 4197.*—Ancash: Between Tallenga and Piscapacha, 3,600–3,800 meters, *Weberbauer 2884* (type of *B. tribrachiata*). Ocros, *Weberbauer 2734.* Caraz, *Weberbauer 3141.*—Huánuco: Pillao, *Ruiz & Pavón* (type of *B. macrocarpa*). Yanahuanca, 3,300 meters, *1172, 1217.* Mito, 2,800 meters, *2957.*—Lima: Matucana, 2,500 meters, *352, 364.* San Gerónimo, 150 meters, *5917.* Huarachiri, *Hrdlicka.*—Junín: Huariaca, 2,900 meters, *3105.* La Oroya, *Kalenborn 67.* Huacapistana, *Weberbauer 1767.*—Moquehua: Carumas, *Weberbauer 7308.*—Cuzco: Cuzco, *Pentland; Herrera 40a, 451, 1018; Stafford 251.* Santa Ana Valley, *Herrera 952.* Sacsahuamán, *Herrera 855, 2727, 3085.* Lares Valley, 1,500 meters, *Herrera 1009.* Urubamba Valley, *Herrera 1380, 1462.* Ollantaitambo, 3,000 meters, *Cook & Gilbert 279.*

A local name for this is "ulubaya." The sweet tubers borne on the roots are eaten.

This is one of the earliest described species of the present genus *Bomarea* and to it have been referred specimens of great variation and of a wide geographical range. Recent studies, however, indicate that it is confined to Peru and the adjacent parts of Bolivia. Most of the specimens cited above appear to come from suberect or decumbent plants; certainly there is little indication that they are

high-climbing vines as are most of the true Bomareas. The quickly dehiscent capsule, however, shows that the relationship is with the true Bomareas rather than *B. distichophylla* and its allies in the subgenus *Sphaerine*. These specimens show little variation in leaf shape, and all have a characteristic indument of long, strigillose hairs on the under side of the nerves. The umbel rays are forked or simple, the latter condition having led Herbert to propose the species *B. simplex*.

52. **Bomarea cordifolia** (R. & P.) Herb. Amaryl. 113, 1837. *Alstroemeria cordifolia* R. & P. Fl. 3: 64. *pl. 290, f. b.* 1802.

A vine; stem stout, glabrous; leaves orbicular-cordate, 10–12 cm. long, 7–8 cm. wide, sparingly strigillose on the nerves beneath; umbel 5–6-rayed, the rays 12–14 cm. long, sparingly pubescent, 2–3 times forked; ovary viscous-tomentose; perianth segments subequal, about 2.5 cm. long; sepals oblong, 5–6 mm. wide, red, the petals spatulate, yellowish red, not spotted.

Huánuco: Posuso, *Ruiz & Pavón* (type).

53. **Bomarea latifolia** (R. & P.) Herb. Amaryl. 113. 1837. *Alstroemeria latifolia* R. & P. Fl. 3: 64. *pl. 295.* 1802. (?) *A. grandifolia* HBK. Nov. Gen. & Sp. 1: 285. 1816. (?) *B. grandifolia* Herb. Amaryl. 113. 1837.

Stem stout, glabrous; leaves broadly oblong-ovate, 10–12 cm. long, 5–6.5 cm. wide, strongly nerved, subglabrous or sparingly strigillose on the veins beneath; bracts ovate-lanceolate, 5–7 cm. long; umbel 7–14-rayed, the rays 4–6 cm. long, once or twice forked, glabrous, the bractlets linear, about 1 cm. long; perianth segments subequal, 3.5–4 cm. long, the sepals 8–10 mm. wide, red, green at the apex, the petals spatulate, about 1.2 cm. wide, green, densely punctate.

Arequipa: Atiquipa, *Ruiz & Pavón* (type).

54. **Bomarea Hookeriana** Herb. Amaryl. 398. *pl. 46, f. 3.* 1837.

A vine, the stem stout; leaves oblong-lanceolate or linear-lanceolate, 12–20 cm. long, 2.5–4.5 cm. wide, glaucous and strigillose with long, crispate hairs on the nerves beneath; bracts linear or setaceous, deciduous; umbel compactly flowered, the rays 4–7 cm. long, pilosulous, once furcate, bearing a filiform bractlet at the fork; sepals oblong, 2–2.5 cm. long, 5 mm. wide, red; petals subequal to the sepals, 6–7 mm. wide, deep orange(?).

Amazonas: Chachapoyas, *Mathews* (type).—Junín: La Merced, 700 meters, *Killip & Smith 23502.*

55. **Bomarea dolichocarpa** Killip, Journ. Wash. Acad. Sci. 22: 62. 1932.

A vine; stem glabrous; leaves lanceolate or ovate-lanceolate, 10–15 cm. long, 1.5–3.5 cm. wide, glabrous, or finely pilose on the nerves beneath; bracts similar to the leaves but smaller; umbel compound, the rays divaricate, up to 25 cm. long, glabrous or finely pilosulous, the primary ones 3–6, 3–4 times furcate, bracteolate at the forks with linear-lanceolate bractlets, the lowest up to 2 cm. long; ovary narrowly obprismatic, more than twice as long as broad, attenuate at the base, glabrous or finely rufo-puberulent; sepals oblong, 2–3 cm. long, 6–9 mm. wide, pink proximally, green distally; petals spatulate-unguiculate, as long as or slightly shorter than the sepals, 6–7 mm. wide, colored like the sepals and densely purple-spotted toward the apex.

Department uncertain: *Maclean.*—Huánuco: Casapí, *Poeppig D.1633.*—San Martín: San Roque, 1,500 meters, *Williams 7022, 7326, 7679, 7771.* Pongo de Cainarachi, *Klug 2724.* Zepelacio, *Klug 3546.* Río Huallaga, *Spruce 4590.*—Loreto: Puerto Arturo, near Yurimaguas, 200 meters, *Williams 5290.* Mouth of Río Ucayali, *Tessmann 3102, 3502.*—Junín: Puerto Yessup, 400 meters, *Killip & Smith 26306* (type).

56. **Bomarea speciosa** Killip, Journ. Wash. Acad. Sci. 22: 61. 1932.

A vine; stem stout, glabrous; leaves broadly lanceolate, 15–20 cm. long, 4.5–5 cm. wide, cuspidate-acuminate, rounded at the base, membranous, glabrous; umbel compound, the primary rays 10–12, about 15 cm. long, stout, rufo-pilosulous, viscid, once or (rarely) twice furcate, bearing at the forks a narrowly oblong-lanceolate, rufo-puberulent bractlet up to 3 cm. long and 8 mm. wide, the secondary rays up to 6 cm. long; sepals oblanceolate, 4–5 cm. long, 8–10 mm. wide, pink, finely puberulent without; petals spatulate, subequal to the sepals, 12–15 mm. wide, the outside white proximally, green distally, pink-ribbed, the inside white, green at the margin, blotched and dotted with purple throughout.

Huánuco: Yanano, 1,800 meters, *3711* (type). Between Huánuco and Pampayacu, *Kanehira 295.*

57. **Bomarea lyncina** Herb. Amaryl. 398. *pl. 46, f. 2.* 1837. (?) *B. sulphurea* Kränzl. Bot. Jahrb. 40: 236. 1908.

A vine; stem glabrous; leaves ovate to oblong-lanceolate, up to 20 cm. long and 7 cm. wide, long-acuminate, glabrous; bracts

numerous, persistent, oblong, up to 2 cm. long and 1 cm. wide, thick, tomentulous; umbel compound, the rays 8–12, tomentulous, 2–4 cm. long, once furcate, bearing at the fork an oblong, concave, persistent bractlet about 1 cm. long; sepals linear-oblong, 2.5–3 cm. long, 5–7 mm. wide, rose; petals spatulate, 3.5–4 cm. long, twice as wide at the apex as the sepals, white, purple-mottled within.

Department uncertain: Sambrabamba, *Mathews 1668* (type).—Junín: Schunke Hacienda, La Merced, 1,200 meters, *5700*.

Further study of the type of *B. sulphurea* (*Weberbauer 4109*, from the Department of Cajamarca) must be made before the status of that species can be fully established.

58. **Bomarea declinata** (Poepp. & Endl.) Klotzsch ex Kunth, Enum. 5: 802. 1850. *Alstroemeria declinata* Poepp. & Endl. Nov. Gen. & Sp. 2: 44. *pl. 160*. 1835. *B. dispar* Herb. Amaryl. 115. 1837. *B. Ulei* Kränzl. Bot. Jahrb. 50: Beibl. 111: 3. 1913.

A vine, glabrous throughout; leaves lanceolate or ovate-lanceolate, up to 25 cm. long and 10 cm. wide, acuminate, rounded at the base; bracts up to 5 mm. long, soon deciduous; umbel compound, the rays 5–6, up to 30 cm. long, 1–3 times forked, the bractlets lanceolate, 5–7 mm. long; sepals oblong, about 2.5 cm. long, 1 cm. wide, orange(?); petals spatulate, about 3 cm. long, 8 mm. wide, yellow, green toward the apex; fruit subglobose, about 2.5 cm. in diameter, bright yellow.

Peru: Without precise locality, *Mathews 1658* (type of *B. dispar*).—San Martín: Tarapoto, 1,200 meters, *Ule 6848* (type of *B. Ulei*).—Huánuco: Cochero, *Poeppig 1586* (type).—Junín: Porvenir, Pichis Trail, 1,500 meters, *Killip & Smith 25942*.

SPECIES DOUBTFULLY OCCURRING IN PERU

Bomarea Lobbiana Kränzl. Ann. Nat. Hofm. Wien 27: 155. 1913. This is identical with *B. cumbrensis* Herb., a common species of Ecuador. Doubtless the type, at Vienna, collected by Lobb, was wrongly labeled "Peru."

Bomarea oligantha Baker, Gard. Chron. 1877, pt. 2: 648. 1877. Based upon a cultivated specimen said to have been of Peruvian origin.

Bomarea sternbergiiflora Kränzl. Ann. Nat. Hofm. Wien 27: 156. 1913. This is *B. obovata* Herb., known only from Ecuador, and probably is another instance of a mislabeled Lobb collection.

2. ALSTROEMERIA L.

Roots thick; flowering stems often nearly leafless; flowers slightly irregular, one inner segment differing from the others.—The species, as they have been accepted, are poorly defined and in Peru there are probably only three, somewhat variable. *A. insignis* Année ex Herincq, Hort. Franç. 4: 2. 1854, is unknown.

Seemingly stemless, the flower sessile in the crowded leaves. *A. pygmaea.*

Stems well developed.

Leaf-like inflorescence bracts densely imbricate..A. *recumbens.*

Inflorescence leaves or bracts relatively remote.

Flowers not uniformly violet or lavender, about 3 cm. long.

Bracts linear, acuminate, or all reduced to scales...*A. Ligtu.*

Bracts lanceolate to oblong or spatulate.

Leaves acute; outer flower segments 2 cm. wide. *A. pelegrina.*

Leaves obtuse; outer flower segments 1.5 cm. wide. *A. chorillensis.*

Flowers uniformly violet or lavender, 4 cm. long....*A. violacea.*

Alstroemeria chorillensis Herb. Bot. Reg. 29: *pl. 58.* Misc. No. 95. 1843.

About 3 dm. high, with thin oblong-spatulate leaves 5–8 cm. long and 2 cm. wide; flowers 3 cm. long, the outer segments purple or lilac, dryng rose-red, obovate, slightly emarginate, the inner narrower, flushed with yellow at the middle and dotted.—The type, figured as *A. lineatiflora,* was a cultivated specimen grown from roots sent by Maclean from Lima. I think most if not all the Peruvian material referred to *A. pelegrina* is rather this species, which, however, seems to be doubtfully distinct from the latter Chilean plant.

Lima: Chosica, *5350* (purple, the 2 lower segments white with yellow middle stripe and with brown streaks). Matucana, *419.* Chorrillos, *5865.*

Alstroemeria Ligtu L. Sp. Pl. ed. 2. 462. 1762.

An erect or weak-stemmed plant often several dm. long, with rather numerous thin, narrowly lanceolate leaves sometimes 5–7 cm. long and 6–12 mm. wide, those in the inflorescence reduced to linear bracts about 2.5 cm. long; flowers 3 cm. long, lilac or pinkish, obliquely purple-streaked, the outer segments obovate-unguiculate,

12 mm. wide, obtuse or cuspidate.—The Weberbauer plant had rose-colored flowers except that the 2 inner segments, only tipped with rose, were yellow with brown streaks. Its crowded inflorescence and nearly leafless stems suggest that it is rather a form of *A. recumbens* Herb., to which I should refer it.—Illustrated in Bot. Reg. *pl. 3.*

Lima: Chorrillos, *Weberbauer 16* (det. Kränzlin). Chile.

Alstroemeria peleğrina L. Sp. Pl. ed. 2: 461. 1762.

Similar to *A. Ligtu*, but the leaves broader, and the broader perianth segments, especially the outer, oblong-cordate with a large cusp.—The inflorescence is open. The flowers are apparently variable in color. The specific name was written *peregrina* by Ruiz and Pavón and by Weberbauer, 82; 143; 146; 170.—Illustrated, Bot. Mag. 4: *pl. 139.*

Ancash: Samanco to Huarás, *Weberbauer 3131* (det. Kränzlin).—Lima: *Raimondi* (rose and yellow). Chancai (*Ruiz & Pavón*).—Huánuco: (*Ruiz & Pavón*). Chile. "Peregrina," "azucena de Lima."

Alstroemeria pygmaea Herb. Amaryl. 100, 397. *pl. 8.* 1837.

A glaucous, loosely tufted, little plant, its stems several cm. long, scarcely produced above the ground, where they bear closely a number of linear-lanceolate leaves (about 2 cm. long) that subtend the solitary, yellowish white flower.—The specific name was first spelled *"pigmaea."*

Junín: Río Blanco, *2997.* Chicla, toward La Oroya, *Weberbauer 233* (det. Kränzlin); 169. Andes of Pasco (*Mathews*). Bolivia; Patagonia.

Alstroemeria recumbens Herb. Amaryl. 97. *pl. 3.* 1837.

Leaves of the recumbent-ascending flowering stems reduced to scales except in the inflorescence where well-developed, and linear to oblong-lanceolate; flowers crowded, 3.5 cm. long, bright purple, the segments all acuminate, the upper petals crossed with bright yellow streaked with purple.—Allied by Baker to *A. versicolor* R. & P. of Chile. The species should perhaps include *A. chorillensis* Herb. Weberbauer has described the flowers as "rose," the 3 inner segments brown-streaked, 2 of them flushed with gold. The crowded leaves are broader than illustrated for the type.

Lima: Amancaes, *Weberbauer 1617* (det. Kränzlin). Without locality (*Cuming 384*, type). Garden of Dr. R. Aspiazu, *2571.*

Alstroemeria violacea Philippi, Fl. Atacam. 51. 1860.

Flowering stems several dm. long, clustered, without foliar leaves below but with scales about 1.5 cm. long; leaves of the sterile stems petioled (petioles to 18 mm. long), eciliate, about 5 cm. long and 2 cm. wide; umbel about 5-rayed; inner and outer flower segments equally long, the former 11 mm. wide, serrulate and long-apiculate with some obscure violet lines but no yellow or white, the outer 14 mm. broad, obovate.—Johnston, Contr. Gray Herb. 85: 24. 1929, describes this beautiful species with violet or lavender flowers and suggests that it merits cultivation. It has the many fleshy roots that characterize all the species, and often a number of old stalks persisting about the base of the flowering ones. Neg. 10049.

Arequipa: Mejía, Cachendo, and Pasco (*Günther & Buchtien 343; 343a; 343b*, acc. to Bruns). Northern Chile.

A. spathulata Presl, Rel. Haenk 1: 122. *pl. 22.* 1827, is a Chilean plant.

3. HYPOXIS L.

Reference: Brackett, Rhodora 25: 120–163. 1923.

The Peruvian species a small, tufted, hairy plant with grass-like leaves that overtop the long-peduncled inflorescence of a few small, yellow flowers.

Hypoxis decumbens L. Syst. Nat. ed. 10. 986. 1759.

Peduncles filiform, 1–4-flowered, or in var. *major* Seub. coarser and 4–8-flowered; mature seeds black, covered with low rounded pebbling.—*H. humilis* HBK., with brown, sharply muricate seeds, known from Ecuador and Bolivia, probably grows in Peru. Both species illustrated, Brackett, *f. 4, 5, 12.*

San Martín: Moyobamba, *Weberbauer 4682* (det. Kränzlin); 288.—Huánuco: Mito, 2,700 meters, *3314.* Widely distributed in tropical America.

4. DISTREPTA Miers

Tecophilaea Bert. ex Colla, 1836.

A slender but low plant with a caudate-acuminate leaf longer than the 1–3-flowered stalk of blue flowers, these borne openly on long pedicels. Corm fibrous-covered.

Distrepta vaginata Miers, Trav. Chile 2: 529. 1826. *Tecophilaea violaeflora* Colla, Mem. Accad. Tor. 39: 20. *pl. 55.* 1836.

Although the range extension is unexpected, the material cited seems to be exactly the same as Chilean specimens.

Lima: San Agustín, 400 meters, *Weberbauer 5230, 5225* (det. Kränzlin). Chile.

5. AGAVE L.

The well-known agave or "maguey" is frequently planted on stone walls or in hedges. Apparently only one species is concerned, referred by Weberbauer 83, 161, 176, 297, 299 (following Ruiz and Pavón), to *A. americana* L., but a single collection at Berlin-Dahlem, *Weberbauer 2378* from Tarma, is labeled by Trelease "true *A. lurida* Ait." Although, as observed by Weberbauer, it is apparently wild in some places, it is doubtful if it is truly indigenous. Native names are "pacpa," "cocui" (Spruce), "pita," and "azul champahra." In Peru as elsewhere it is an important source of fiber. Herrera has noted that the terms "cceshuapacpa" or "occe-pacpa" apply when it is grown as a fence to protect chacras, and "orcco-pacpa" applies to single examples. "Pita," "cabuya," and "cordel" refer to the fiber.

6. FOURCROYA Vent.

Coarse plants similar in habit to *Agave*, but the flowers whitish and wheel-shaped, and the filaments fleshy at base.—The name is spelled variously, originally by the author as above, and also as *Furcraea*, but it commemorates Antoine François de Fourcroy, a chemist of the late eighteenth century.

Fourcroya andina Trel. in Bailey, Stand. Cycl. Hort. 3: 1305. 1915. *F. Deledevanti* Riv. Rev. Cult. Colon. 11: 68. 1902(?).

Leaves oblong-lanceolate, large, with prominent curved remote teeth.—Apparently the name of Rivière is valid, but Trelease refers it, with "*F. altissima* Hort.," to doubtful synonymy, and as I have not seen the publication, the action is followed. Neg. 9999.

Junín: On the Perené, *Furlong*, type.—Cuzco: Santa Ana, *Herrera 1000*. Cedrobamba, 2,500 meters, *Herrera 1721*.—Lima: Matucana, 2,400 meters, *2921*. Cabello, 2,400 meters, *1338*. "Chuchau," "chunta pacpa."

Fourcroya occidentalis Trel. Bot. Jahrb. 50: Beibl. 111: 5. 1913.

Leaves narrowly oblong and minutely aculeate.—Most of Weberbauer's many references to *F. cubensis* Vent. concern this

plant rather than the preceding. It belongs to the western hill country, at least typically. Neg. 10000.

Ancash: Matucara, 2,300 meters, *Weberbauer 1687*, type.—Loreto: Upper Río Huallaga, 900 meters, *Williams 6766 (?)* (doubtful, the flowers smaller and the leaves narrower).—Lima: Matucana, 2,400 meters, *2922*. "Penca."

7. ZEPHYRANTHES Herb.

Pyrolirion Herb.

Bulbous plants with short or elongate scapes bearing 1–2 funnel-shaped flowers, the tube little prolonged. Filaments long, entirely free.—Cultivated forms taken by Williams include (apparently) *Z. carinata* Herb. and *Z. gracilifolia* (Schult. f.) Baker.

Flowers large (several cm. long), bright-colored.

Perianth throat without scales.....*Z. flava.*

Perianth throat with scales within.....*Z. tubiflora.*

Flowers small, 1–3 cm. long, pale.

Flowers about 12 mm. long, the tube obsolete.....*Z. gracilis.*

Flowers twice as long, with obvious tube.

Tube 5 mm. long; stigmas foliose.....*Z. Briquetii.*

Tube 15 mm. long; stigmas capitate.....*Z. parvula.*

Zephyranthes Briquetii Macbr. Field Mus. Bot. 11: 9. 1931.

Diminutive, the 2–3 linear leaves prostrate, scarcely 1 mm. wide, 3–6 cm. long; scape 1–3 cm. long, 1-flowered; spathe bifid to base, 1.5 cm. long; pedicel 3–4 mm. long; perianth white, sometimes violet-dotted, 2 cm. long, the slender tube rather abruptly ampliate, the subequal segments subrotund; filaments free, 3 mm. long, dilated below, affixed at top of tube; stigma 3-foliose, well included.—Growing with cushion and rosette plants.

Moquehua: Carumas, *Weberbauer 7322*.

Zephyranthes flava (Herb.) Baker, Amaryl. 37. 1888. *Pyrolirion flavum* Herb. App. Bot. Reg. 37. 1821. *Z. Beustii* Schinz, Viertelj. Zür. Nat. Ges. 60: 424. 1915(?).

Scapes 1–3 dm. high or taller and exceeding the leaves; flower yellow, sessile in the membranous sheath, to nearly 1 dm. long; perianth tube destitute of scales within.—Apparently known only in cultivation from material sent from Lima in 1834, unless recently

collected by von Beust (*654*) but unfortunately without recorded locality.—Illustrated, Bot. Reg. 20: *pl. 1724*, as *P. aureum*.

Zephyranthes gracilis Herb. Amaryl. 172. *pl. 29*. 1837.

Peduncle short, slender; pedicel shorter than the spathe, this 15 mm. long; perianth white(?), 12 mm. long, the tube nearly obsolete, the segments oblanceolate, 2 mm. wide, equaled by the trifid style and nearly by the stamens.

Peru: Puerto de Santa María (*Ruiz*).

Zephyranthes parvula Killip, Journ. Wash. Acad. Sci. 16: 566. 1926.

Peduncle about 1.5 cm. high; spathe closely investing the perianth tube, this narrowly funnelform and 1.5–2 cm. long, pink above as also the (5–7 mm. wide) oblong segments; stamens inserted at about the middle of the tube, reaching the lower third of the segments; stigmas capitate.

Cuzco: Hills of Sacsahuamán, 3,500 meters, *Herrera 822*. "Pulla-pulla."

Zephyranthes tubiflora (L'Hér.) Schinz, Viertelj. Zür. Nat. Ges. 60: 425. 1915. *Amaryllis tubiflora* L'Hér. Sert. Angl. 10. 1788. *A. aurea* R. & P. Fl. 3: 56. *pl. 286*. 1802. *A. peruviana* Ker, Bot. Mag. 27: *pl. 1089*. 1808. *Pyrolirion aureum* Herb. App. Bot. Reg. 37. 1821. *Z. aurea* Baker, Amaryl. 37. 1888.

Similar to *Z. flava* (which could be treated as a variety), but the perianth at the throat provided with small toothed scales.—This, with *Hymenocallis*, is one of the most attractive flowers in the green season on the coastal hills.

Lima: Lurín, Chorillos, etc. (*Ruiz & Pavón*); (*Haenke*). "Huamancae de Antibo."

Zephyranthes tubiflora (L'Hér.) Schinz, var. **flammea** (R. & P.) Macbr. Field Mus. Bot. 11: 9. 1931. *Amaryllis flammea* R. & P. Fl. 3: 56. *pl. 286*. 1802. *Z. flammea* Baker, Amaryl. 37. 1888.

Flowers flame-colored.

Lima: Chancai (*Ruiz & Pavón*). "Huamancae," "huamancayos."

8. COOPERIA Herb.

Distinguished from *Zephyranthes* by the white flowers with greatly elongate, slender tube and very short filaments.

Cooperia albicans (Herb.) Sprague, Kew Bull. 386. 1928. *Pyrolirion albicans* Herb. Amaryl. 184. 1837. *Zephyranthes albicans* Baker, Amaryl. 38. 1888.

Scapes and narrow leaves 1–2 dm. high; flowers very fragrant, sessile in the tight spathe, the tube 7 cm. long, slightly widened only at throat, the lobes 4 cm. long; filaments slightly united at the broad base, 1 mm. long.—On the sandhills of Mollendo in October.

Arequipa: Ilo (type locality). Near Chule, 80 meters (*Günther & Buchtien 347*). Mollendo, *Weberbauer 1510* (det. Kränzlin); 82, 144; (*Albert Pam*). "Amancaes," "flor de amancaes."

9. CROCOPSIS Pax

Crocus-like in habit, the solitary, orange and black-dotted flower rising directly from the bulb, the base more or less concealed in the sheath and leaves. Otherwise nearly *Cooperia*, but the tube not greatly prolonged, and longer filaments more definitely connate at the base.

Crocopsis fulgens Pax, Bot. Jahrb. 11: 324. 1889.

Leaves 3–4 cm. long; flowers 6 cm. long, the lobes one-third as long as the tube, the throat 1 cm. broad; filaments 1.5 cm. long.

Peru: Tacore to Tomarape, 4,200 meters (*Stuebel*, type).—Cuzco: Redonda, 3,350 meters, *Herrera 3040*.

10. CHLIDANTHUS Herb.

A rather coarse plant with a solid 2-edged scape arising from a cluster of several leaves and terminating in an umbel of 1–4 bright yellow flowers. Filaments short, from a deltoid base; anthers ligulate.

Chlidanthus fragrans Herb. App. Bot. Reg. 46. 1821.

Flowers sessile or subsessile in the large lanceolate spathes, fragrant, the tube 3–10 cm. long, tinged with green, the segments oblong, cuspidate, 3–3.5 cm. long.—Illustrated, Bot. Reg. 8: *pl. 640;* Fl. Serres 4: *pl. 326*.

Amazonas: Chachapoyas (*Mathews 3180*).—Without locality: (*Pavón*).—Arequipa: Lomas of Atiquipa and Capac, *Raimondi* (det. Kränzlin).—Tacna: *Woitschach*. Ecuador; Argentina. "Amancaes," "amancay."

11. CRINUM L.

Similar to *Chlidanthus*, but the flowers white or reddish, often many, and the filiform filaments with linear versatile anthers. —Williams has collected several cultivated species as escapes at San Roque and on the Amazon, apparently *C. asiaticum* L., *C. erubescens* Ait., and *C. zeylanicum* L.

Crinum undulatum Hook. Exot. Fl. 3: *pl. 200*. 1827.

A stout plant from a long-necked bulb; leaves ensiform, to 4.5 dm. long and 2.5 cm. wide, longer than the peduncle; spathe valves and perianth tube green, the latter twice as long, about 2 dm. long, curved before the flower expands; segments undulate, 7 cm. long; filaments red.

Loreto: *Ule* (det. Kränzlin). Middle Río Blanco, *Tessmann 3063* (det. Kränzlin.) Brazil.

12. HYMENOCALLIS Salisb.

Ismene Salisb.; *Elisena* Herb.; *Liriope* Herb.; *Liriopsis* Reichenb.

Stout plants with oblong or linear leaves and solid peduncles bearing an umbel of several showy, white or yellow flowers. Perianth tube not at all funnelform, or only above, or broadly funnelform, the narrow lobes finally spreading. Stamens from a more or less conspicuous, often serrate cup, the free part of the filaments often short. —As with *Zephyranthes*, frequently cultivated for the beautiful fragrant flowers. Williams found *H. littoralis* (Jacq.) Salisb. cultivated or as an escape on the Río Huallaga.

Perianth tube elongate, narrow or funnelform only above.
- Flowers bright yellow ..... *H. Amancaes.*
- Flowers white or more or less tinged with green.
  - Flowers solitary ..... *H. quitoensis.*
  - Flowers 2 or usually several.
    - Stamen cup irregularly lacerate; tube 2.5 cm. long .. *H. nutans.*
    - Stamen cup with rounded but toothed processes; tube 3.5 cm. long or longer.
      - Filaments 2.5 cm. long or longer ..... *H. deflexa.*
      - Filaments 5–12 mm. long.
        - Perianth tube straight, 3–5 cm. long .... *H. pedunculata.*
        - Perianth tube funnelform above, 7–10 cm. long. *H. narcissiflora.*

Perianth tube broadly funnelform, short.

Filaments 4–6 cm. long..... *H. longipetala.*

Filaments half as long or shorter.

Filaments about 3 cm. long..... *H. ringens.*

Filaments about 1 cm. long..... *H. sublimis.*

Hymenocallis Amancaes (R. & P.) Nichols. Dict. Gard. 2: 165. 1885. *Narcissus Amancaes* R. & P. Fl. 3: 53. *pl. 283.* 1802. *Pancratium Amancaes* Ker, Bot. Mag. 30: *pl. 1224.* 1809; Bot. Reg. 7: *pl. 600.* 1821. *Ismene Amancaes* Herb. App. Bot. Reg. 46. 1821.

The only species with yellow flowers; perianth tube tinged with green, about 7 cm. long, the linear segments bright yellow and 5 cm. long, or about equaling the cup, this green-striped and toothed.—The Amancaise or festival of Amancaes celebrated at Lima on June 24 is a gala day somewhat similar to May Day in English lands. At that time the Amancaes mountain near Lima is glorified with thousands of the brilliant blossoms, and their abundance and beauty seem all the more remarkable because of the semi-desert character of the mountain slopes they color. There is a vivid account by Stewart of the festival, which is quoted from his "Visit to the South Seas" in Bot. Mag. 65: under *pl. 3675.*

Lima: In the loma hills, *Weberbauer,* 82; 143; 146. Recorded by Ruiz and Pavón from the hills of Amancaes, Hamancaes, Chancai, Lurín, and Surco. Atonocongo, 250–500 meters, *Pennell 14746.* "Amancaes," "hamancaes."

Hymenocallis deflexa (Herb.) Baker, Amaryl. 128. 1888. *Ismene deflexa* Herb. Bot. Reg. 25: Misc. 88. 1839.

Leaves less than 5 cm. wide; flowers 3–4, the curved tube about 3.5 cm. long, the linear segments 7.5–10 cm. long, the funnel-shaped cup 5–7.5 cm. long, with rounded recurved processes.—Produced by Col. Trevor Clarke by crossing *H. narcissiflora* and *H. longipetala.*

Hymenocallis longipetala (Lindl.) Macbr. Field Mus. Bot. 11: 11. 1931. *Elisena longipetala* Lindl. Bot. Reg. 24: Misc. 45. 1838; Bot. Mag. 67: *pl. 3873.* 1841; Saund. Ref. Bot. 4: *pl. 264.* 1871.

Leaves about 6, to 3.5 cm. wide, shorter than the tall peduncle, 6–9 dm. long; flowers 5–10, the tube 6–9 mm. long, the linear segments 1 dm. long, the deflexed funnel-shaped cup about 3.5 cm. long, its edge reflexed.

Lima: (*Farris*).—Libertad: Prov. Santiago de Chuco, 3,000 meters, *Weberbauer 7204*. Prov. Huamachuco, *Weberbauer 7213*.—Cuzco: Mollepata, cultivated, *Herrera 1457*. "Tamancay."

Hymenocallis narcissiflora (Jacq.) Macbr. Field Mus. Bot. 11: 11. 1931. *Pancratium narcissiflorum* Jacq. Fragm. Bot. *pl. 138*. 1809. *P. calathiforme* Redouté, Lil. 6: *pl. 353*. 1812. *P. calathinum* Ker, Bot. Reg. 3: *pl. 215*. 1817. *Ismene calathina* Herb. App. Bot. Reg. 46. 1821; Bot. Mag. 53: *pl. 2685*. 1826. *H. calathina* Nichols. Dict. Gard. 2: 165. 1885.

Leaves 6–8, to 5 cm. wide and 6 dm. long, about equaling the 2–5-flowered peduncle; perianth segments white, lanceolate, as long as the green tube, 12 mm. broad; cup green-striped, 5 cm. long and wider, with rounded spreading toothed processes.—Introduced into cultivation in 1794. According to Herbert, native to the Andes of Peru and Bolivia.

Peru: According to Herbert.

Hymenocallis nutans (Herb.) Baker, Amaryl. 128. 1888. *Ismene nutans* Herb. App. Bot. Reg. 46. 1821. *Pancratium calathinum* Ker, Bot. Mag. 38: *pl. 1561*. 1813, not of later date and authors.

A species of doubtful origin but Herbert thinks "Andean." Its tube is only about 2.5 cm. long, the linear segments twice as long, the cup 3.5 cm. long, and the free filaments 6–8 mm. long.

Hymenocallis pedunculata (Herb.) Macbr. Field Mus. Bot. 11: 11. 1931. *Ismene pedunculata* Herb. Amaryl. 222. *pl. 35*. 1837. *I. Macleana* Herb. Bot. Mag. 65: *pl. 3675*. 1839. *I. virescens* Lindl. Bot. Reg. 27: *pl. 12*. 1841. *H. Macleana* Nichols. Dict. Gard. 2: 165. 1885.

Similar to *H. narcissiflora* except for the slender and much shorter tube, the linear segments, and the shorter cup, about 3.5 cm. long.

Peru: (*Maclean*).

Hymenocallis quitoensis Herb. App. Bot. Reg. 44. 1821. *Ismene tenuifolia* Baker, Bot. Mag. 104: *pl. 6397*. 1878. *Pamianthe quitoensis* Stapf, Bot. Mag. *pl. 9315*. 1933.

A beautiful plant with thin tufted leaves about 2.5 cm. wide, and a slender peduncle several dm. high, bearing a single large, green and white flower; tube 7–10 cm. long, the segments lanceolate, 6–7.5

cm. long and 12 mm. broad; cup 5 cm. long, with large, quadrate, sharply toothed processes between the inflexed filaments, these about 9 mm. long.

Tumbes: Hacienda Chicana, *Weberbauer 7628*. Ecuador.

Closely related to this species is *Pamianthe peruviana* Stapf, Gard. Chron. II. 93: 106. *f. 51*. 1933; Bot. Mag. 156: *pl. 9315*. 1933. It was described from plants grown by Major Albert Pam in his warm-house at Wormley Bury, Broxbourne, Herts, England, from bulbs collected in the "warm-temperate zone in northern central Peru at an altitude of 1800 m." The genus *Pamianthe* needs further study before its validity is determined.

Hymenocallis ringens (R. & P.) Macbr., comb. nov. *Pancratium ringens* R. & P. Fl. 3: 53. *pl. 283*. 1802. *Liriope ringens* Herb. App. Bot. Reg. 42. 1821. *Elisena ringens* Herb. Amaryl. 201. 1837.

Similar to *H. longipetala*, but flowers much smaller; tube 18 mm. long, the segments only 3.5 cm. long; cup 12 mm. long.—Apparently known only in cultivation, even by Ruiz and Pavón.

Hymenocallis sublimis (Herb.) Macbr. Field Mus. Bot. 11: 11. 1931. *Elisena sublimis* Herb. Bot. Mag. 67: sub *pl. 3873*. 1841.

Distinguished from *H. ringens* by the pedicellate flowers with segments 5 cm. long, and shorter filaments.

Libertad: Cajamarquilla (*Maclean*).

13. EUCHARIS Planch.

Well marked by the petioled, ovate to ovate-elliptic leaves and large white umbellate flowers. Stamens borne from the edge of a cup, the filaments undulate or dentate below.—Beautiful plants, well known in cultivation as "Amazon lilies." There are many illustrations besides those cited here.

Flowers about 5–6 cm. broad.

Perianth tube dilated at throat, to 12 mm. wide . . *E. grandiflora.*

Perianth tube little dilated, much narrower . . . . . *E. Bakeriana.*

Flowers to about 4 cm. broad.

Flowers medium-sized, 3–4 cm. wide, pediceled.

Flowers few, 3–5 . . . . . *E. Ulei.*

Flowers 7–10 . . . . . *E. narcissiflora.*

Flowers small, about 1.5–2 cm. wide.

Flowers sessile ..... *E. galanthoides.*

Flowers pediceled ..... *E. Castelnaeana.*

Eucharis Bakeriana N. E. Brown, Gard. Chron. III. 7: 416. 1890.

Flowers 6 cm. in diameter, the tube little dilated; cup funnelform, about 15 mm. deep and wide, with 2 obtuse oblong teeth between each pair of filaments.—Illustrated, Bot. Mag. 116: *pl. 7144.*

Loreto: Pampas de Ponasa, *Ule* (det. Kränzlin). Colombia.

Eucharis Castelnaeana (Baill.) Macbr. Field Mus. Bot. 11: 47. 1931. *Calliphruria Castelnaeana* Baill. Bull. Mens. Soc. Linn. Paris 2: 1135. 1894.

Apparently very distinct by the small and narrow flowers, the corolla tube 1.5 cm. long, the limb 2 cm. wide; petioles to 3 times longer than the oval leaves; peduncle twice as long as the petiole, bearing several white flowers, the bracts and bractlets scarious; crown 6-lobed, each lobe 2-toothed; style obtusely 3-lobed.—Perhaps in the narrow corolla simulating the Colombian genus *Calliphruria* Herb., which, however, has free filaments, winged below and toothed at each side.

Loreto: Pampa del Sacramento (*Castelnau*).

Eucharis galanthoides (Klotzsch) Planch. & Lind. Cat. 17, pt. 1: 4. 1862. *Mathieua galanthoides* Klotzsch, Allg. Gartenz. 21: 337. 1853.

Leaves ovate, blunt, long-petioled, about 1 dm. long and 3 cm. broad; perianth 3.5 cm. long, the tube 1.5 cm. long, dilated at the throat to 5 mm. broad, the limb inflated-campanulate, 1.5 cm. long and broad; cup adnate to the tube throughout, edentate; filaments slightly dilated at the base; ovary subsessile, 3-celled.—A species known to me only from a single flower at Dahlem referable to the genus. Very distinct by its small capitulate sessile white flowers, and doubtfully referable to the genus.

Piura: Paita, *Warscewicz.*

Eucharis grandiflora Planch. & Lind. Fl. Serres 9: 255. *pl. 957.* 1854. *E. amazonica* Lind. Cat. Hort. 4. 1856.

Perianth tube curved, 5 cm. long, dilated at the throat to 12 mm. wide; cup consisting of 4 quadrate connate segments about 12 mm. long, with a short filament, lanceolate at the base, from the center of each.

Cajamarca: Prov. Jaén, *Weberbauer 6251* (det. Kränzlin).—Loreto: Upper Marañón, *Tessmann 4782*. Middle Ucayali, *Tessmann 3179*.—San Martín: North of Moyobamba, *Weberbauer 4642*. San Roque, 1,350 meters, *Williams 7802, 7748*(?). Lamas, 840 meters, *Williams 6348*. Colombia. "Amancay."

Eucharis narcissiflora Huber, Bol. Mus. Goeldi 4: 543. 1906.

Leaves about 4 dm. long, the petiole and lance-ovate blade subequal; scape to 4 dm. high, bearing an umbel of 7-10 flowers; pedicels 2–4 cm. long and 6–10 mm. wide; cup 5 mm. high.—Seemingly different from other species in its numerous small flowers, 4 cm. broad, and long petioles. Fruits of the Williams specimens nearly 2 cm. broad, the pedicels 1.5 cm. long; seeds black, 8 mm. long, only slightly lustrous and not at all metallic.

Loreto: Sarayacu to Catalina, Pampa del Sacramento (*Huber 1514*). Pebas, *Williams 1896* (ex char.). Santa Rosa, *Williams 4906* (?; fruit). Puerto Arturo, *Williams 5051* (?; fruit). Santa Rosa, 135 meters, *Killip & Smith 28886*. Puerto Arturo, *Killip & Smith 27844*.—Junín: Puerto Yessup, 400 meters, *Killip & Smith 26394*. "Sacha-cebolla," "amangay."

Eucharis Ulei Kränzl. Bot. Jahrb. 50: Beibl. 111: 4. 1913.

Apparently very similar to *E. narcissiflora*, but the pedicels mostly shorter, 1.5–2.5 cm. long, the flowers fewer, and the cup 7–10 mm. high.—The author referred here doubtfully *Ule 5737b*, in fruit, with elliptic rather than oblong-lanceolate leaves. *Williams 2629, 2878*, and *2619* from La Victoria have the same foliage. The first is accompanied by flowers; the latter two collections by fruits with lustrous purple seeds like those of Ule's plant. *Williams 4906* and *5051* from the lower Río Huallaga have dull seeds and elliptic leaves, and probably represent another species. The following collections are typical in foliage, and the fruits resemble those of *Ule 5737b*. The species is thus variable in leaf form or, more likely, two species are concerned, the flowers of only one being known. Neg. 9965.

Loreto: Lower Río Nanay, *Williams 431*. Pebas, *Williams 1787*. Brazil.

14. STENOMESSON Herb.

Reference: Baker, Amaryl. 113–117. 1888.

Slender-leaved bulbous plants with solid or fistulose scapes, rarely greatly reduced, bearing one to several umbellate flowers,

variously colored but never white. Stamens from or below the edge of a cup which is often toothed between the filaments.—The species are mostly not well marked, and the following resumé is compiled chiefly from Baker, Handb. Amaryl. 1888. Two keys are provided in an attempt to lead to the species accepted by him, without passing on their validity, often doubtful. The synonymy is often involved and no attempt has been made to have it complete. The juice from the bulbs is sometimes used as mucilage.

Key based on flower color

Flowers green or tipped with green, or greenish white, never yellow or yellowish.
  Flowers green throughout.
    Cup crenate.....*S. viridiflorum.*
    Cup deeply 6-cleft.....*S. Elwesii.*
  Flowers more or less suffused with red.
Flowers red or yellow, or red and yellow or orange, or green-tinged.
  Flowers yellow, or in part orange, if rather red, solitary.
    Flowers yellow or greenish yellow.
      Pedicels 5–10 cm. long; leaves to 2.5 cm. wide.....*S. Pearcei.*
      Pedicels 1–3 cm. long; leaves to 1.5 cm. wide.
        Leaves well developed after the flowers; filaments long.
          S. croceum.
        Leaves well developed with the flowers; filaments short.
          Flowers 2; filaments broad at base.....*S. luteum.*
          Flowers 1; filaments slender.....*S. Macleanicum.*
      Pedicels about 2.5 cm. long; leaves about 2.5 cm. wide.
        Cup acutely toothed; bulbs somewhat elongate.
          Cup teeth simple or reduced.....*S. latifolium.*
          Cup teeth bifid.....*S. pauciflorum.*
        Cup shortly and obtusely toothed; bulb depressed.
          S. vitellinum.
    Flowers bright orange or reddish yellow or, if orange- or blood-red, solitary.
      Flowers 2–6 in an umbel.
        Leaves with the flowers; flowers 5–6 cm. long.
          S. recurvatum.

Leaves usually after the flowers; flowers 2.5–4 cm. long. *S. aurantiacum.*

Flowers solitary..... *S. humile.*

Flowers blood-red or scarlet, or sometimes orange-red but not solitary.

Leaves developed after the flowers.

Cup distinctly toothed..... *S. coccineum.*

Cup not toothed..... *S. suspensum.*

Leaves developed with the flowers.

Leaves about equaling the scape; flowers not dotted. *S. incarum.*

Leaves much exceeding the scape; flowers dotted. *S. longifolium.*

Key based mostly on characters other than color

Stamen cup entire; flowers never green.

Peduncle very short; flower solitary..... *S. humile.*

Peduncle well developed; flowers usually 2 to several.

Leaves lanceolate, about 2.5 cm. wide.

Flowers greenish yellow, the throat dilated... *S. latifolium.*

Flowers orange, narrow..... *S. aurantiacum.*

Leaves linear, 0.5–1.5 cm. wide.

Leaves usually much exceeding the scape, 4 dm. long or longer; flowers dotted..... *S. longifolium.*

Leaves about equaling the scape or developed after the flowers; flowers apparently never dotted.

Leaves developed after the flowers.

Flowers horizontal or ascending, yellow or bright orange.

Flowers solitary; filaments about 6 mm. long. *S. Macleanicum.*

Flowers several; filaments about 1 cm. long.

Flowers bright orange, the tube not abruptly dilated. *S. aurantiacum.*

Flowers yellow, the tube abruptly dilated at the middle..... *S. croceum.*

Flowers somewhat drooping, bright scarlet. *S. suspensum.*

Leaves developed with the flowers.
Flowers reddish yellow; filaments elongate. *S. recurvatum.*
Flowers red or yellow; filaments very short.
Flowers red, the pedicels flexible or drooping, 4–6. *S. incarum.*
Flowers yellow, ascending, 1–2.
Flowers 2; filaments broad at base..... *S. luteum.*
Flower 1; filaments slender..... *S. Macleanicum.*

Stamen cup toothed or, if merely crenate, the flowers green.
Flowers entirely green.
Stamen cup crenate..... *S. viridiflorum.*
Stamen cup deeply 6-cleft..... *S. Elwesii.*
Flowers not green, sometimes partly so or green-tinged.
Teeth of the stamen cup entire.
Teeth acute and well developed; flowers red.... *S. coccineum.*
Teeth obtuse or acute but short, or obscure; flowers reddish or greenish yellow or yellow.
Cup teeth obtuse, short; flowers yellow.... *S. vitellinum.*
Cup teeth obscure; flowers pale yellow or reddish.
Leaves developed with the flowers..... *S. recurvatum.*
Leaves developed fully after the flowers... *S. croceum.*
Teeth of the stamen cup bifid or toothed.
Flowers 6–10 cm. long, usually reddish and green-tipped. *S. variegatum.*
Flowers 3–5 cm. long, yellow and green-tinged, or red or orange-red.
Flowers yellow, 2, on short pedicels..... *S. pauciflorum.*
Flowers greenish yellow, several, the limb broad; pedicels 5–10 cm. long..... *S. Pearcei.*

Stenomesson aurantiacum (HBK.) Herb. App. Bot. Reg. 40. 1821; 113. *Pancratium aurantiacum* HBK. Nov. Gen. & Sp. 1: 280. 1816. *S. Hartwegii* Lindl. Bot. Reg. 30: *pl. 42.* 1844.

Bulb globose; leaves linear, well developed only after the flowers; peduncle 3 dm. long or longer, bearing 3–6 flowers, these sometimes nodding, about 3.5 cm. long; filaments dilated at base, the cup entire.

Lima: Matucana, *Weberbauer 6294* (det. Krause as *S. flavum*).—Cajamarca: Río Huancabamba above Shumaya, *Weberbauer 6294* (det. Kränzlin).—Cuzco: Hills of Sacsahuamán, 3,600 meters, *Herrera 1574*. Ecuador. "Cebolla-cebolla."

Stenomesson coccineum (R. & P.) Herb. App. Bot. Reg. 40. 1821; 115. *Pancratium coccineum* R. & P. Fl. 3: 54. *pl. 285*. 1802. *S. rubrum* Herb. Amaryl. 199. *pl. 28*. 1837. *Coburgia coccinea* Herb. Bot. Mag. 67: *pl. 3865*. 1841. *C. venusta* Herb. Bot. Reg. 28: Misc. 54. 1842. *C. praecipitata* Herb. loc. cit.

Leaves 4–5, appearing after the flowers, linear, bright green, channeled, about 3 dm. long, to 12 mm. wide; flowers 4–8, on pedicels 2.5–4 cm. long, bright or salmon or cinnamon red, 3–4 cm. long, the tube 4 mm. wide and half as long as the oblong segments; cup teeth simple or shortly toothed; style finally exserted.—A form with rose-colored flowers and lanceolate leaves (*S. breviflorum* Herb. Amaryl. 199. 1837) was collected by Maclean. Baker suggests that it is a variety. My specimens from the type locality have shortly 2-toothed cup teeth; No. 1584 has laterally toothed cup teeth. *Weberbauer 1692* has the orange flowers of *S. aurantiacum*, but the cup is toothed!

Junín: Tarma (*Ruiz & Pavón*); *1078*. Río Marañón, *1980*. Morocancha; Cajamarquilla.—Huánuco: Mito, *1584*.—Lima: San Agustín, *Weberbauer 5* (det. Krause as *S. flavum*). Pacharra, *Dombey*.—Ancash: Cajabamba, 3,700 meters, *Weberbauer 3038* (det. Kränzlin as *S. suspensum*, but cup long-toothed, the teeth simple).—Cuzco: Urubamba Valley, *Herrera 1969*.

Stenomesson croceum (Savigny) Herb. Amaryl. 199. *pl. 28*. 1837; 114. *Pancratium croceum* Savigny in Lam. Encycl. 4: 735. 1797. *P. flavum* R. & P. Fl. 3: 54. *pl. 284*. 1802. *S. flavum* Herb. Bot. Mag. 53: *pl. 2641*. 1826, as to name. *S. Ruizianum* Kunth, Enum. 5: 642. 1850.

Leaves and scape about 3 dm. high; flowers pale yellow, 3.5–5 cm. long or longer, the slender tube abruptly dilated at the middle; cup indistinctly toothed.—Referred to by Weberbauer, 137, *pl. 7;* 143; 146; 164; 166.

Lima: Lurín (*Ruiz & Pavón*); (*Dombey*).

Stenomesson Elwesii (Baker) Macbr. Field Mus. Bot. 11: 10. 1931. *Callithauma viridiflorum* (R. & P.) Herb. var. *Elwesii* Baker, Gard. Chron. n. s. 9: 756. 1878. *S. viridiflorum* (R. & P.) Benth. var. *Elwesii* Baker, Amaryl. 116. 1888.

Stamen cup deeply 6-cleft, the lobes quadrate and emarginate.—Although no further differences between *S. viridiflorum* and this plant have been described, the floral structure is so entirely at variance to that of the former species that it appears to merit more than varietal recognition. Known only in cultivation, by Elwes.

Stenomesson humile (Herb.) Baker in Saund. Ref. Bot. 5: *pl. 308.* 1872; 114. *Clitanthes humilis* Herb. Bot. Reg. 25: Misc. 87. 1839. *Coburgia humilis* Herb. op. cit. 28: 55. 1842. *S. acaule* Kränzl. Bot. Jahrb. 40: 237. 1908.

A readily recognized species by virtue of its crocus-like habit, the very short (to 1 dm.) peduncle bearing a single erect orange-red flower; leaves linear, at anthesis only 2–4 cm. long, developing to 3 dm. long; flowers 5–6 cm. long; cup entire. Neg. 97.

Junín: La Oroya, 3,700 meters, *Weberbauer 1714;* 180; 182. Palcamayo, 3,300 meters (*Maclean*).—Cuzco: At 4,000 meters (*Pearce*).—Ancash: Huarás, *Raimondi.*

Stenomesson incarum Kränzl. Bot. Jahrb. 40: 238. 1908. *Coburgia minita* Lindl. Bot. Reg. 30: Misc. 13. 1844(?).

Bulb globose; leaves before anthesis 3–3.5 dm. long, to 12 mm. wide; flowers 4 or 5, nodding, 6 cm. long, gradually ampliate to nearly 2 cm. wide; cup not toothed; filaments very short; style and stamens subequal.—Allied to *S. coccineum* and *S. suspensum.* Rocky places in the lomas. Neg. 9967.

Arequipa: Tambo, near Mollendo, *Weberbauer 1564;* 146. Below Cachendo, 800 meters (*Günther & Buchtien 344*).

Stenomesson latifolium Herb. Bot. Mag. 67: *pl. 3803.* 1841; 114. *Chrysiphiala flava* Ker, Bot. Reg. 10: *pl. 778.* 1824, as to plant. *S. flavum* Herb. Bot. Mag. 53: *pl. 2641.* 1826, as to plant. *S. flavum* of auth., not R. & P.

Leaves oblanceolate, several dm. long and about 2.5 cm. wide, equaling the peduncle; flowers 4–6, the tube greenish or pale yellow, the limb and lobes bright yellow; cup teeth more or less regularly developed, simple and acute; style finally exserted.—The interpretation of the application of the names *S. croceum* and *S. flavum* is that of Herbert and Baker. To avoid confusion, the name *S. flavum* should not be used for the *S. flavum* of authors, and since the name *S. latifolium* seems to refer to essentially the same plant, it becomes the next available name.

Lima: (*Maclean*).—Cuzco: Above Piri, *Weberbauer 4935;* 243.

Stenomesson longifolium Kränzl. Bot. Jahrb. 40: 238. 1908.

Allied to *S. recurvatum*, but the leaves greatly elongate, 4 dm. or longer, the red, apparently dotted flowers 4 cm. long, and the filaments very short. Flowers nodding only after anthesis. Neg. 9966.

Lima: Tambo de Viso, *Weberbauer 121*, type. Between Surco and Matucana, *Raimondi*. Rocky cliff, Matucana, *2942, 461*.—Arequipa: Mascuri, *Raimondi*. "Amancay colorado."

Stenomesson luteum (Herb.) Baker in Saund. Ref. Bot. 5: sub *pl. 308*. 1872; 115. *Clinanthus luteus* Herb. App. Bot. Reg. 40. 1821. *Clitanthes lutea* Herb. Bot. Reg. 25: Misc. 87. 1839. *Coburgia lutea* Herb. op. cit. 28: Misc. 55. 1842.

Leaves linear, 1–2 dm. long, about equaling the 2-flowered scape; pedicels 3 cm. long or shorter; perianth yellow, 5 cm. long, funnelform, erect or ascending; filaments broadly winged below with no space between them.—Later referred by Baker to *S. recurvatum*.

Peru: (*Ruiz*, type).

Stenomesson Macleanicum (Herb.) Macbr. Field Mus. Bot. 11: 10. 1931; 115. *Clitanthes Macleanica* Herb. Bot. Reg. 25: Misc. 87. 1839. *Coburgia Macleanica* Herb. op. cit. 28: Misc. 55. 1842.

Similar to *S. luteum*, but the scape 1-flowered and the cup truncate between the slender filaments.—Referred by Baker to *S. recurvatum*.

Lima: At about 3,500 meters, below Chicla above San Mateo (*Maclean*, type).

Stenomesson pauciflorum (Lindl.) Herb. Amaryl. 198. *pl. 28*. 1837; 114. *Chrysiphiala pauciflora* Lindl. ex Hook. Exot. Fl. 2: *pl. 132*. 1825.

Similar to *S. latifolium*, but the thick golden-yellow green-tipped flower with an abruptly ampliate limb, and the short teeth between the filaments bifid.—With its variety it approaches *S. variegatum*, of which it is perhaps only a variety. Introduced from Peru by Cowan in 1824, and apparently not recollected. By Baker, with the following variety, treated as a variant of *S. flavum*.

Stenomesson pauciflorum var. **curvidentatum** (Herb.) Macbr. Field Mus. Bot. 11: 11. 1931. *S. curvidentatum* Herb. Bot. Mag. 53: *pl. 2640*. 1826.

Perianth slender, and bifid cup teeth elongate.—Apparently not known since its introduction in 1825.

Stenomesson Pearcei Baker in Saund. Ref. Bot. 5: *pl. 308.* 1873; 113.

Related to *S. pauciflorum;* leaves developed after(?) the flowers, several dm. long; peduncle 6–9 dm. high; flowers 6–8, only 3–4 cm. long, the limb broad, yellow or green-tinged; cup teeth bifid.—The Weberbauer specimen was referred by Kränzlin to *S. latifolium,* but the cup teeth are bifid!

Cuzco: Ollantaitambo, 2,800 meters, *Herrera 698.* Piri, 3,000 meters, *Weberbauer 4935.*—Junín: Yanahuanca, 3,000 meters, *1227.*—Puno(?): (*Lechler*). Bolivia.

Stenomesson recurvatum (R. & P.) Baker in Saund. Ref. Bot. 5: sub *pl. 308.* 1872; 115. *Pancratium recurvatum* R. & P. Fl. 3: 54. *pl. 285, f a.* 1802.(?) *Coburgia recurvata* Herb. Bot. Reg. 28: 54. 1842. *Carpodetes recurvata* Herb. App. Bot. Reg. 41. 1821.

Leaves linear, 3 dm. long and to 1 cm. wide, developed with the flowers and about equaling the peduncle; pedicels 2.5–9 cm. long; flowers reddish yellow or rarely yellowish, 6 cm. long; cup obscurely toothed; style finally exserted.—Baker, probably rightly, refers here *Coburgia discolor, C. obragillensis,* and *C. angusta,* all proposed by Herbert, Bot. Reg. 28: 54–55. 1842.

Lima: Canta and Obrajillo (*Ruiz & Pavón*). *Raimondi* (det. Herb. Dahlem as *S. aurantiacum*). "Chihuanhuaita."

Stenomesson suspensum Baker in Saund. Ref. Bot. 1: *pl. 22.* 187. 1869; 115.

Leaves and slender peduncle about 3 dm. long; flowers 4–6, drooping, on pedicels 2.5–4 cm. long, bright scarlet, the limb 2.5–3 cm. long; filaments lanceolate at base, with no tooth between them.—Described from cultivated plants.

Libertad: Prov. Otuzco, 1,200 meters, *Weberbauer 6985.*

Stenomesson variegatum (R. & P.) Macbr. Field Mus. Bot. 11: 11. 1931; 115. *Pancratium variegatum* R. & P. Fl. 3: 55. 1802. *P. incarnatum* HBK. Nov. Gen. & Sp. 1: 280. 1816. *Coburgia trichroma* Herb. Bot. Mag. 67: *pl. 3867.* 1841. *C. variegata* Herb. Amaryl. 196. 1837. *C. fulva* Herb. Bot. Reg. 18: *pl. 1497.* 1832; Bot. Mag. 60: *pl. 3221.* 1833. *S. incarnatum* Baker in Saund. Ref. Bot. 5: sub *pl. 308.* 1872.

Bulb with a well-developed neck; leaves several, with the flowers, several dm. long and about 2.5 cm. wide; peduncle stout, hollow, to 6 dm. high; flowers 2–4, on short pedicels, the curved tube 6–8

cm. long, pale or bright red or tawny, the segments, conspicuously keeled with green, 2–2.5 cm. long; filaments united below, with a bifid tooth between them.—Variable in color and, according to Baker, *Coburgia chachapoyensis*, *C. versicolor*, *C. laeta*, and *C. langensis* proposed by Herbert, Bot. Reg. 28: Misc. 53. 1842, are only forms. There are further synonyms.

Amazonas: Chachapoyas (*Mathews*).—Cuzco: Hills of Sacsahuamán, *Herrera 37, 197, 1265*. "Naihua," "flor del clarín," "huaccanquilla."

Stenomesson viridiflorum (R. & P.) Benth. & Hook. Gen. Pl. 3: 733. 1883; 116. *Pancratium viridiflorum* R. & P. Fl. 3: 55. 1802. *Callithauma viridiflorum* Herb. Amaryl. 225. 1837; Bot. Mag. 67: *pl. 3866*. 1841.

A remarkable species, to 1 meter high, the stout peduncle bearing several emerald-green flowers 7 cm. long; leaves 2–2.5 cm. wide; stamens inserted below the edge of the crenate cup, equaling the perianth segments; style not exserted.—The var. *angustifolium* (Herb.) Macbr. Field Mus. Bot. 11: 10. 1931 has narrower leaves, stamens shorter than the segments, and style exserted.

Junín: Woods, Huasahuasi (*Ruiz & Pavón*). Rocky headlands, Palca (*Ruiz & Pavón; Maclean*).

Stemonesson vitellinum Lindl. Bot. Reg. 29: *pl. 2*. 1843; 114.

Confused with *S. latifolium* and *S. croceum*, but the long peduncle arising abruptly from the much-flattened bulb, and the cup teeth short, obtuse, and entire.—Apparently known only in cultivation.

Lima: (*Maclean*).

Callithauma (?) *spathulatum* Herb. Amaryl. 225. 1837, with coriaceous petioled spatulate leaves, may be a Peruvian species of *Stenomesson* related to *S. viridiflorum*. It is practically a nomen nudum.

75. HIPPEASTRUM Herb.

Reference: L. H. Bailey in Bailey, Stand. Cycl. Hort. 1492–1494. 1915.

Vigorous bulbous plants with stout hollow peduncles bearing 2 to several large and very showy flowers. Throat of the perianth closed or provided with a crown or scales.—This genus is the amaryllis of cultivation, but the true *Amaryllis* is restricted more or less

arbitrarily to a single species with a solid peduncle and without scales between the filaments.

Perianth tube 2.5 cm. long or shorter.

Perianth throat narrowed, or closed by a neck or collar.

Plant entirely leafless at flowering..... *H. fuscum.*

Plant with at least developing leaves at anthesis.

Flowers red-spotted; stigma capitate..... *H. pardinum.*

Flowers striped, not spotted; stigma 3-parted... *H. Forgetii.*

Perianth throat not constricted.

Flowers with 2 red feathery stripes on each side of the segments; stigma 3-parted..... *H. vittatum.*

Flowers evenly red, at least in part.

Flowers bright red with a green-white base.... *H. puniceum.*

Flowers red but with a white star in the throat or a bifid white mark on each segment.

Leaves developing after the flowers..... *H. reginae.*

Leaves developing with the flowers.

Perianth segments 5 cm. wide; anthers 12 mm. long or longer..... *H. Leopoldii.*

Perianth segments 2.5–3 cm. wide; anthers 6 mm. long. *H. miniatum.*

Perianth tube about 1 dm. long..... *H. solandriflorum.*

Hippeastrum Forgetii Worsley, Journ. Roy. Hort. Soc. 38: 73. 1912.

Intermediate between *H. vittatum* and *H. pardinum;* flowers only partially striped, green at base; leaves well developed at flowering time.

Cuzco: (*Forget*).

Hippeastrum fuscum Kränzl. Bot. Jahrb. 40: 237. 1908.

Flowers dark-dotted, about 1 dm. long, the segments only 2.5–3.5 cm. broad. Neg. 341.

Puno: Between Sandía and Cuyocuyo, 2,500 meters, *Weberbauer 1056;* 237.

Hippeastrum Leopoldii (Moore) Dombrain, Floral Mag. 9: *pl. 475–476.* 1870. *Amaryllis Leopoldii* Moore, Gard. Chron. 30: 733. *pl. 140.* 1870.

Flowers nearly regular, about 1.5 dm. across, the segments 5 cm. wide, bright red at the middle, white toward the tip and with a bifid white mark in the red below, the throat greenish white.

Peru: (*Pearce*).

Hippeastrum miniatum (R. & P.) Herb. App. Bot. Reg. 31. 1821. *Amaryllis miniata* R. & P. Fl. 3: 57. 1802.

Nearly *H. reginae*, but apparently the leaves developing earlier. —The validity of this species is doubtful.

Cuzco: Valley of the Apurímac, *Herrera 807* (det. Herb. Dahlem). —Huánuco: Chinchao, etc. (*Ruiz & Pavón*). Quebrada of Pariahuanco (*Mathews*). "Lacre de montaña," "aputocto," "apotocto."

Hippeastrum pardinum (Hook. f.) Dombrain, Floral Mag. 6: *pl. 344*. 1867. *Amaryllis pardina* Hook. f. Bot. Mag. 93: *pl. 5645*. 1867.

Readily known by the greenish yellow flowers densely spotted with red, the segments about 4 cm. broad but much narrowed at the base.

Peru: (*Pearce*).

Hippeastrum puniceum (Lam.) Urban, Symb. Ant. 4: 151. 1903. *Amaryllis punicea* Lam. Encycl. 1: 122. 1783. *H. equestre* Herb. App. Bot. Reg. 31. 1821. *A. equestris* Ait. Hort. Kew. 1: 417. 1789.

This is the widely cultivated and widely distributed "Barbados lily." The flowers are sometimes 10 cm. across, with a green tube 2.5 cm. long.—Illustrated, Bot. Mag. 9: *pl. 305*.

Puno: Valley of Sangabán, *Raimondi*.—Loreto: Middle Ucayali, *Tessmann 3126*. Chanchahuayo (*Huber 1386*). Pebas and Caballococha, *Williams*.—Junín: Chinchao Valley, *Weberbauer 6816* (det. Kränzlin). Mexico to Chile and Brazil.

Hippeastrum reginae (L.) Herb. App. Bot. Reg. 31. 1821. *Amaryllis reginae* L. Syst. ed. 10. 977. 1759. *H. stenopetalum* A. Dietr. ex Koch, Wochenschr. 37. 1874(?).

Flowers bright red with a large, greenish white star in the throat, the segments 2.5–3 cm. wide; stigma slightly lobed.—Illustrated, Bot. Mag. 13: *pl. 453*.

Junín: Chanchamayo, *Raimondi* (det. Herb. Berol.).

Hippeastrum solandriflorum Herb. App. Bot. Reg. 31. 1821.

The long, greenish white, funnel-shaped flowers identify this species.—There are illustrations in Bot. Mag. 52: *pl. 2573*, and 66: *pl. 3771*.

Cuzco: Valley of the Apurímac, 2,700 meters, *Herrera 1242*. Valley of Paucartambo, 3,450 meters, *Herrera 199*. Brazil to Colombia and the Guianas. "Jamancai."

Hippeastrum vittatum (L'Hér.) Herb. App. Bot. Reg. 31. 1821. *Amaryllis vittata* L'Hér. Sert. Angl. 13. 1788.

The only species whose flowers are striped with red between the white keel and white, more or less irregular edges of each perianth segment. The flowers are 7–12 cm. across, the segments 2.5 to nearly 4 cm. broad.—Illustrated, Bot. Mag. 4: *pl. 129*.

Peru: Said to be a native of the Andes and introduced into Europe in 1769. A common species of cultivation.

16. URCEOLINA Reichenb.

Sphaerotele Presl, Rel. Haenk. 1: 119. *pl. 16*. 1827; *Sphaerothelè* Benth. & Hook. Gen. Pl. 3: 733. 1883.

Bulbous plants with petioled, oblong or lanceolate leaves, often developed after the slender-pediceled pendulous umbellate flowers. Perianth tube cylindrical but suddenly dilated, the upper portion distinctly urceolate.—Except for lacking the cup, the genus approaches *Stenomesson*. The generic name is conserved in preference to several earlier ones.

Flowers red, not green or white-tipped..... *U. peruviana*.

Flowers not red, or at least green-tipped.

Flowers 5 cm. long or longer, the slender tube abruptly terminating. *U. urceolata*.

Flowers 3.5 cm. long or shorter, the tube more or less dilated at tip.

Lobes white-margined; tube 6–12 mm. long.

Tube about 12 mm. long..... *U. fulva*.

Tube about 6 mm. long..... *U. microcrater*.

Lobes green-margined; tube less than 2.5 cm. long. *U. latifolia*.

Urceolina fulva Herb. Amaryl. 194. *pl. 26*. 1837. *U. pendula* Herb. var. *fulva* Herb. ex Kränzl. Bot. Jahrb. 54: Beibl. 117: 4. 1916.

Similar to *U. latifolia*, but the flowers more slender and the much narrower tube only slightly dilated beneath the tawny or yellow, apparently white-margined limb which is nearly 2.5 cm. long; leaf blades about 2.2 dm. long and 1 dm. wide, the petiole 1 dm. long.

Peru: Parcahuanca (*Mathews 868*).

Urceolina latifolia (R. & P.) Benth. & Hook. Gen. Pl. 3: 732. 1883. *Pancratium latifolium* R. & P. Fl. 3: 54. *pl. 284*. 1802.

Petioles only 2–3 cm. long; flowers 6–8, yellow or reddish, tipped with green and white, the thickish tube dilated suddenly into a funnel in the upper third, the segments to 2.5 cm. long.

Junín: Vitoc (*Ruiz & Pavón*). Ecuador.

Urceolina microcrater Kränzl. Bot. Jahrb. 54: Beibl. 117: 3. 1916.

Leaves absent at anthesis; flowers about 5; tube green, slightly dilated to 6 mm.; perianth campanulate, with lanceolate yellow lobes 2 cm. long, green-margined and white-tipped. Neg. 9998.

Huánuco: Posuso Valley, 1,600 meters, *Weberbauer 6741*. Posuso, 600 meters, *4712*. Río Huallaga below Río Santo Domingo, 1,200 meters, *4245*.

Urceolina peruviana (Presl) Macbr. Field Mus. Bot. 11: 11. 1931. *Sphaerotele peruviana* Presl, Rel. Haenk. 1: 120. *pl. 16*. 1827. *Pentlandia miniata* Herb. Bot. Reg. 25: *pl. 68*. 1839. *P. miniata* var. *lacunosa* and var. *Sulivanica* Herb. loc. cit. *S. coccinea* Link, Kl. & Otto, Icon. 95. *pl. 38*. 1842. *U. miniata* Benth. & Hook. Gen. Pl. 3: 732. 1883.

Leaves produced after the flowers, narrowed at each end, to 3.5 cm. wide at the middle or narrower; flowers 2–6, scarlet or reddish yellow, the limb 3.5 cm. long, the lower half of the tube cylindrical but the upper somewhat urceolate.—The flowers, as Herbert remarks, simulate those of *Stenomesson croceum*, and connect the genera. The stamens are exserted several millimeters.

Cuzco: Urubamba Valley, 3,200 meters, *Herrera 1120*. Quispicancha (*Pentland*, type).—Lima: (*Maclean*).—Puno: Sandía, *Weberbauer 1354a* (det. Kränzlin).—Apurímac: Prov. Cotabambas, *Raimondi*.—Without locality: *Mathews*. Bolivia. "Uluipiña," "caruay piña."

Urceolina urceolata (R. & P.) Asch. & Graebn. Syn. Mitt. Eur. Fl. 3: 409. 1906. *Crinum urceolatum* R. & P. Fl. 3: 58. *pl. 287*.

1802. *U. pendula* Herb. Amaryl. 193. 1837; Bot. Mag. 90: *pl. 5464.* 1864.

Readily known by its narrow green tube 2.5 cm. long, which is most abruptly dilated for the upper third, this bright yellow; limb green, with a white edge.—The leaves, to 1 dm. wide, borne on elongate petioles, are developed with the flowers. The first Weberbauer collection was referred by Kränzlin to *U. latifolia.*

Huánuco: Posuso and Pampayacu (*Ruiz & Pavón*).—Junín: Río Portachuelo, *Weberbauer 6652.*—Cuzco: Marcapata Valley, 1,600 meters, *Weberbauer 7822.*

17. PHAEDRANASSA Herb.

Very similar to *Urceolina* except that the flowers are cylindrical from base to apex.—Besides the species recorded, *P. dubia* (HBK.) Macbr. (*P. chloracea* Herb.) of Ecuador is to be expected. It has red flowers, deeply stained at the tip with green, the tube somewhat shorter than the segments, and the style well exserted.

Flowers greenish.

Leaves several; flowers many.....*P. megistophylla.*

Leaves solitary; flowers few.....*P. viridiflora.*

Flowers red, with green tips.....*P. Carmioli.*

Phaedranassa Carmioli Baker in Saund. Ref. Bot. 1: *pl. 46.* 1869.

Leaves 1–2, oblong-lanceolate, acute, to 7.5 cm. wide and 6 dm. long, equaling the glaucous-green peduncle; flowers 8–10, on pedicels 2.5 cm. long; perianth limb 5 cm. long, the tube 3 times longer than the oblong-lanceolate connivent segments which are green with a pale edge; style not reaching tip of stamens.—It would seem, from a range standpoint, that the following collection is referable rather to *P. dubia* (see under generic description).

Cuzco: At 3,450 meters (*Herrera*). Costa Rica.

Phaedranasssa megistophylla Kränzl. Bot. Jahrb. 54: Beibl. 117: 2. 1916.

Largest leaves about 4 dm. long and 1 dm. broad; peduncle 7–10 dm. high, bearing as many as 20 blue-green flowers on pedicels 6–8 cm. long; perianth segments connate below, 4 cm. long. Neg. 340.

Cajamarca: Between Bellavista and the mouth of the Chinchipe, 500 meters, *Weberbauer 6225.* "Oreja de burro."

Phaedranassa viridiflora Baker, Gard. Chron. n. ser. 8: 134. 1877.

A single lanceolate leaf to 5 cm. wide; flowers about 4, drooping, greenish yellow but whitish toward the base and green at the tip, 3.5 cm. long.

Cajamarca: Prov. Jaén, *Weberbauer 6228* (det. Kränzlin).—Huancayo: On the way to the montaña, *Raimondi*. Ecuador.

18. EUCROSIA Ker

Callipsyche Herb. Bot. Reg. 28: Misc. 49. 1842.

Allied to *Phaedranassa*, which it resembles in foliage, but the funnelform flowers irregular, with very long-exserted stamens.—Besides the species listed, *E. bicolor* Ker, with orange-red and *E. aurantiaca* (Baker) Pax with bright yellow flowers, both Ecuadorian, may be expected.

Eucrosia eucrosioides (Herb.) Pax, Pflanzenfam. II. 5: 115. 1887. *Callipsyche eucrosioides* Herb. Bot. Reg. 28: Misc. 50. 1842. *C. mexicana* Roem. Syn. Ensat. 155. 1847.

Flowers fewer than a dozen, green except for the scarlet limb which is about 2.5 cm. long; stamens over 1 dm. long.—Except for the Weberbauer collection, with no locality indicated, known only in cultivation.

Peru: *Weberbauer 9*.

19. EUSTEPHIA Cav.

Slender plants, the compressed scape, terminating in an umbel of several to many pediceled flowers. Perianth regular, the tube short; filaments free but narrowly or broadly winged in the lower half, and with a slender tooth on each side.

Eustephia armifera Macbr. Field Mus. Bot. 11: 47. 1931.

Conspicuously leafy, the nearly oblong leaves 2–3 dm. long, 12–15 mm. wide, lax and probably sometimes prostrate; scape about 1.5 dm. tall; larger bract nearly 4 cm. long; flowers about 5, 2.5–3 cm. long, subsessile, gradually ampliate, the tube obsolete, the very unequal lobes 6–8 mm. long; filaments narrowly winged, the lateral teeth borne at the apex just below the anther, this 7 mm. long, subequal to the discoid foliose stigma.—The collector described the flowers as "blood-red without, yellowish within." The stamen recalls to mind the ancient type of spear.

Cuzco: Grassy places in shrub-wood, Marcapata, 3,100 meters, *Weberbauer 7806*, type.

Eustephia coccinea Cav. Icon. Pl. 3: 20. *pl. 238*. 1794. *E. Macleanica* Herb. Bot. Mag. 67: sub. *pl. 3865*. 1841(?).

Leaves 3–4, linear, developing after the flowers, several dm. long, as also the scape; pedicels to 2.5 cm. long; perianth bright red, tipped with green, 3–3.5 cm. long.—Until recently, known only in cultivation from Andean plants sent to England by Maclean.

Cuzco: About Cuzco, 3,400 meters, *Herrera 806*.—Huánuco: Río Marañón below Chavanillo, 2,250 meters, *2304*.—Junín: Yanahuanca, 3,000 meters, *1177*. "Campanilla," "uluipiña,""para-para."

32. TACCACEAE

Reference: Limpricht, Pflanzenr. IV. 42. 1928.

Tacca Ulei Limpricht, op. cit. 22, has been found at Manaos, Brazil, so the occurrence in Peru of this or other species is probable. *T. Ulei* has part of the leaves entire and lacks the curious filiform bract-like structures that are so conspicuous among the bracteate leaves in some other species.

33. DIOSCOREACEAE. Yam Family

Reference: R. Knuth, Pflanzenr. IV. 43. 1924.

1. DIOSCOREA [Plum.] L.

Herbaceous or ligneous vines with alternate or opposite, more or less cordate-based leaves and tiny, usually dioecious, 6-parted flowers. Stamens 6 or 3, or 3 often reduced to staminodia. Fruit a 3-winged capsule. Seeds more or less winged.—Knuth arranges the species according to the character of the fruits and seeds, but the pistillate plants of the Peruvian forms are mostly unknown. The tuber of *D. trifida* L. is the well-known "yam," or in Spanish "ñame" or some modification of this name. The widely distributed (but not native to America) and widely grown *D. alata* L. (called "sacha-papa" according to Poeppig, Reise 2: 377), known by the many little bulbs borne on the stems, probably occurs in some parts of Peru, as already recorded from the Amazon region. Determinations by or verified by Knuth. All key statements, unless otherwise stated, apply to the staminate plants.

Leaves lobed or 3–5-foliolate.
Leaves mostly 3-parted to the base.
Flowers solitary.
Male flowers pedicellate; anthers small.....*D. trifoliata.*
Male flowers sessile; anthers large.....*D. cubijensis.*
Flowers glomerulate.....*D. trisecta.*
Leaves more or less deeply 3–5-lobed.....*D. trifida.*
Leaves entire or at least not lobed (the base often cordate).
A. Vines.
B. Flowers, at least the male, mostly fasciculate, partly in clusters of 2–3.
C. At least some of the male flowers pedicellate or the fascicles pedicellate.
Leaves small, only to 3 cm. long and 13–14 mm. wide.
D. Weberbaueri.
Leaves rather to much larger.
D. Leaves firm or papery, mostly longer than 4 cm., the cross veins obvious.
Racemes 2–8 cm. long, or few, if any, longer.
Leaves glabrous.
Leaves cordate-lunate at base.....*D. putisensis.*
Leaves rounded-cordate at base..*D. callacatensis.*
Leaves puberulent on the nerves beneath.
D. ainensis.
Racemes or the inflorescence mostly more than 1 dm. long (1–5 dm.).
Leaves glabrous; racemes few to many.
Leaves cordate.
Sinus about 1 cm. deep.
Sinus open; leaves acutely acuminate.
D. moyobambensis.
Sinus narrow; leaves obtuse, mucronulate.
D. tambillensis.
Sinus about 5 mm. deep.
Leaves merely acute.....*D. iquitosensis.*
Leaves often mucronate.....*D. ramonensis.*
Leaves rounded at base.....*D. apurimacensis.*

Leaves puberulent beneath; racemes many.

Leaves large (to 1.5 dm.), with 9–13 nerves. *D. Stegelmanniana.*

Leaves about half as large, the nerves fewer. *D. tarmensis.*

D. Leaves very thin, rarely 4 cm. long, the cross veins obscure..... *D. chancayensis.*

C. Flowers and glomerules sessile.

Spikes usually simple or not corymbed with spreading branches.

Leaves more or less lunate-cordate at base; stamens 3.

Inflorescence often 1–2-branched; leaves usually 6–10 cm. wide..... *D. polygonoides.*

Spikes simple; leaves rarely 5 cm. wide.. *D. elegans.*

Leaves V-cordate at base; stamens 6..... *D. sandiensis.*

Spikes branched or corymbose.

Spikes glabrous, as also the leaves.

Leaves about 2.5 cm. wide..... *D. apurimacensis.*

Leaves about 10 cm. wide..... *D. perenensis.*

Rachis pubescent, as also the leaves beneath. *D. arifolia.*

B. Flowers, at least male, solitary or mostly not definitely fasciculate.

E. Flowers many, the stamens not connate.

Leaves definitely pubescent beneath or the hairs fasciculate-stellate.

Leaves cordate at base.

Leaves 12–14-nerved..... *D. grandis.*

Leaves 7–9-nerved.

Inflorescence spicate, branching.

Leaves glabrous above..... *D. arifolia.*

Leaves minutely scabrous above (typically). *D. amarantoides.*

Inflorescence racemose, simple..... *D. calcensis.*

Leaves attenuate at base..... *D. Pavonii.*

Leaves (mature) glabrous or merely scabrous or minutely puberulent on the nerves.

Flowers sessile.

Spikes neither panicled nor corymbed (rarely in *D. bulbifera*).

Leaves 9-nerved, more or less cordate; stems terete or subangled.

Leaves deeply cordate.

Spikes mostly 3 in each axil.....*D. bulbifera*.

Spikes mostly solitary.....*D. Poeppigii*.

Leaves shallowly cordate.....*D. pozucoensis*.

Leaves 5–7-nerved, subtruncate; stems sometimes angled.

Stems angled, herbaceous, slender....*D. riparia*.

Stems terete, subligneous, stout.....*D. Klugii*.

Spikes paniculate or corymbose, at least the upper.

Woody vine, the leaves 2–2.5 cm. wide. *D. apurimacensis*.

Herbaceous, the leaves wider.

Leaves conspicuously reticulate-veined and lustrous above.....*D. Macbrideana*.

Leaves neither conspicuously reticulate nor lustrous.

Leaf sinus 2–4 cm. deep.....*D. chagllaensis*.

Leaf sinus about 1 cm. deep or shallower.

Leaves somewhat bulging above the base; fruits about 1 cm. long..*D. nicolasensis*.

Leaves gradually narrowed to tip; fruit somewhat larger.

Leaves more or less cordate at base; spikes to 4 cm. long.....*D. amarantoides*.

Leaves truncate or subtruncate at base; spikes often longer..*D. pinedensis*.

Flowers pedicellate.

Pedicels 5–8 mm. long or longer or the racemes very lax.

Leaves 13–15-nerved.

Stems scarcely if at all sulcate.....*D. mitoensis*.

Stems deeply sulcate.....*D. grandis*.

Leaves 5–9-nerved.

Leaves 7–9-nerved, about 1 dm. long.
D. piperifolia.

Leaves 5(–7)-nerved, about half as long.
D. quispicanchensis.

Pedicels 1–4 mm. long (cf. *D. piperifolia* with very lax racemes).

Male racemes rarely single, simple, or sometimes branched (*D. coriacea*).

Petioles 1.5–3 cm. long.

Stamens 6; leaf nerves glabrous or the pubescence minute.

Leaves about 1 dm. long....*D. larecajensis.*

Leaves about half as long.

Leaves thin, the veinlets obscure.
D. chancayensis.

Leaves firm, the veinlets obvious.
D. syringaefolia.

Stamens 3; leaves glabrous or arachnoid.

Flowers 4–5 mm. broad; conspicuous nerves 7–9.....*D. tayacajensis.*

Flowers half as broad; conspicuous nerves 3.
D. incayensis.

Petioles much shorter.....*D. coriacea.*

Male racemes single, or branched.

Leaves cordate-lanceolate, about 13 cm. long and 9 cm. wide or smaller.

Longer petioles to 6 cm.; stems about 3–4 mm. thick.

Inflorescence ample, much branched.
D. Wittiana.

Inflorescence simple or partly so.*D. calcensis.*

Longer petioles to 2.5 cm. long; stems slenderer.
D. coriacea.

Leaves cordate-ovate or subrotund, the larger about 2 dm. broad.

Stems rigid, subterete; style column very short.
D. Haenkeana.

Stems sulcate-angled; style column elongate(?).

Leaves not caudate-acuminate.

D. dodecaneura.

Leaves markedly caudate-acuminate.

D. huallagensis.

E. Flowers few (about 4) or sometimes 12 and the stamens connate.

Leaves puberulent beneath.

Sinus widely open.....*D. monadelpha.*

Sinus closed below by the lobes.....*D. mitoensis.*

Leaves glabrous or soon glabrous beneath...*D. longirachis.*

A. Erect herb a few cm. high.....*D. ancachsensis.*

Dioscorea ainensis Knuth, Repert. Sp. Nov. 29: 93. 1931.

Stems 3–4 mm. thick, sulcate and minutely puberulent; leaves 6–8 cm. remote, on slender petioles often 4.5 cm. long, 9-nerved, cordate-acuminate, incised 1 cm. at base, abruptly caudate, the acumen very acute, 1 cm. long; male racemes 6–10 cm. long, 1–3 in the axils or corymbed; fascicles 1–3-flowered, 2–4 mm. distant; perianth campanulate, 3–3.5 mm. long, the obtuse lanceolate lobes red-glandular-punctate, little exceeding the stamens.—Sect. *Macrogynodium.*

Ayacucho: Aina, between Huanta and Río Apurímac (*Killip & Smith 22742*).

Dioscorea amarantoides Presl, Rel. Haenk. 1: 134. 1827; 243.

More or less pubescent or sometimes glabrous; leaves cordate-ovate or cordate-lanceolate, more or less scabrous above, 7-nerved, sometimes small or very large but usually about 1 dm. long and half as broad; petioles from 2.5 cm. long, typically, as the leaves beneath, villous; male spikes 2.5 to nearly 4 cm. long, congested in panicles as much as 4 dm. long; stamens 3; capsule 2 cm. wide and 13 mm. long.—The principal Peruvian variations have been recorded by Knuth as var. *cruminigera* (Mart.) Uline, with oblong-ovate glaucous leaves with narrow sinuses; var. *pendula* (Poeppig) Knuth with the ovate-lanceolate leaves sparsely scabrous beneath; var. *decorticans* (Presl) Uline with elliptic-rotund leaves, these all pubescent; and vars. *Ulei* Knuth and *paniculata* Knuth, with glabrous leaves, in the latter with exceptionally elongate panicles.

Loreto: Yurimaguas, *Poeppig 2446b; Spruce 3899.*—Huánuco: (*Haenke*). Casapí, *Poeppig 1074*, type. Río Acre, *Ule 9171, 9172, 9173.*—Without locality: *Ruiz & Pavón.*

Dioscorea ancachsensis Knuth, Pflanzenr. IV. 43: 202. 1924.

A glabrous, glaucous, nearly succulent, diminutive plant from a tuber 2 cm. thick, the branchlets square; male flowers many, in subumbellate fascicles; leaves cordate or triangular-rotund, about 8 mm. long and broad, but the upper even smaller; female spikes solitary, 2–3-flowered; stamens 6; capsule apparently rotund-quadrangular.—The specific name is from that of the department, which is sometimes spelled Ancach. Neg. 10419.

Ancash: Prov. Pallasca, 3,800 meters, *Weberbauer 7249, 7248.*

Dioscorea apurimacensis Knuth, Repert. Sp. Nov. 29: 94. 1931.

A scandent but scarcely twining, glabrous plant with rather stout (4 mm. thick), subterete stems and oblong, abruptly and acutely acuminate leaves, the upper 5.5 cm. long, 2.5 cm. wide; petioles 1–1.7 cm. long; racemes 5–11 cm. long, often corymbed, the inflorescence to 4 dm. long; rachis naked for about 1 cm.; capitulate verticels 3–6 mm. distant; perianth pale, urceolate, the obtuse lobes about twice exceeding the small-anthered stamens.—Sect. *Cryptantha.*

Ayacucho: Valley of the Río Apurímac, 400 meters (*Killip & Smith 22938*).

Dioscorea arifolia Presl, Rel. Haenk. 1: 134. 1827; 245.

Petioles (2.5 cm. long) and terete branches (except at tip) glabrous; leaves subhastate-cordate, long-acuminate, 7-nerved, about 1 dm. long and half as broad; male peduncles to 3 dm. long, only the upper simple, the spikelets mostly in 3's, the rachis puberulent.—Not clearly distinct from *D. amarantoides.*

Peru: According to *Presl.*

Dioscorea bulbifera L. Sp. Pl. 1035. 1753; 88.

Often well marked by the presence of aerial bulbs; leaves ample, thin, on petioles 6–14 cm. long provided at base with oblong-lanceolate stipules; male spikes 3–10 cm. long; stamens 6, minute; female spikes 1–2.5 dm. long; flowers 4–5 mm. long, usually appressed; capsules oblong, 2.5 cm. long, 1.5 cm. broad.—According to Klug, the Loreto name refers to the falling of the ripe "edible fruit" when touched. Widely cultivated or distributed; cf. Knuth, 38.—Illustrated, Pflanzenr. IV. 43: *pl. 13;* 19.

Loreto: Mishuyacu near Iquitos, *Klug 1015.* "Toca y cae."

Dioscorea calcensis Knuth, Repert. Sp. Nov. 30: 159. 1932.

Stems striately sulcate, with the petioles (4–10 cm.), leaves beneath, and rachis puberulent; leaves broadly cordate-ovate, to 1 dm. long and 8 cm. wide, often much smaller, thin, 9–11-nerved, the sinus broadly V-shaped, the apex markedly apiculate; male racemes solitary or with 1–2 shorter, the longer 1.5 dm.; pedicels filiform, about 4 mm. long; flowers turbinate-campanulate, nearly 3 mm. long; stamens 3; included; female spikes solitary; flowers about 3 mm. wide; capsules about 17 mm. long, 7 mm. wide, the seeds winged toward the apex.

Cuzco: Lares Valley, Prov. Calca, 1,400 meters, *Weberbauer 7928, 7928a.*

Dioscorea callacatensis Knuth, Repert. Sp. Nov. 28: 83. 1930.

More or less branching, glabrous, the scarcely sulcate stems 2 mm. thick above; leaves lanceolate, rounded at base or slightly cordate, gradually narrowed and very acute at apex, papery, often 7 cm. long and 1.5 cm. wide at base; petioles 1 cm. long; racemes 2.5–5 cm. long, the peduncle 1 cm. long, like the rachis filiform; pedicels 1 mm. long; flowers subcampanulate, 1.5 mm. broad; stamens 3.—With *D. elegans* the only Peruvian species of the section *Hyperocarpa.*

Cajamarca: Cayacati, *Raimondi.*

Dioscorea chagllaensis Knuth, Repert. Sp. Nov. 28: 88. 1930.

Glabrous, tall, the stems slightly sulcate, 3 mm. thick, the internodes often 1 dm. long; leaves papery, to 1.5 dm. long and 9 cm. wide but often smaller, elongate-ovate with a basal sinus 2 cm. deep, gradually and acutely acuminate; nerves 9 or 11; petioles slender, sometimes 6 cm. long; male inflorescence much branched, to 9 dm. long, the rachis puberulent; flowers nearly 2 mm. wide; stamens 6; female racemes glabrous, in flower 1 dm. long, greatly elongating in fruit; capsules 15 mm. long and broad, brown, quadrate, the angles rounded; seeds 5 mm. long and broad, winged.—High on tree tops.

Huánuco: Chaclla, 2,800 meters, *3651*, type.—Loreto: Mishuyacu, *Klug 168.*

Dioscorea chancayensis Knuth, Repert. Sp. Nov. 28: 81. 1930.

Glabrous, scarcely tall, the stems slender; leaves alternate, 1–1.5 dm. distant, thin, about 5 cm. long, triangular with cordate base, acute, 9-nerved, the 3-nerved area narrowly lanceolate, the basal lobes rounded; petioles often 3 cm. long; male racemes to 4.5 cm.

long, 1 to many in the leaf axils; pedicels 1–2 mm. long; flowers a little over 1 mm. long, deeply parted; stamens 6, the filaments free. —Allied to *D. sandiensis*.

Lima: Pativilca, Chancai, 200 meters, *Weberbauer 7486*.

Dioscorea coriacea Humb. & Bonpl. ex Willd. Sp. Pl. 4: 794. 1806; 116. *D. sativa* Presl, Rel. Haenk. 1: 134. 1827, not L.

Glabrous, the angulate stems ligneous; leaves variable in shape, size, and texture, but distinctive by the very short petioles; male racemes often floriferous to base, typically but not always 3–5 in the leaf axils; pedicels 2–4 mm. long; perianth 2.5–3.5 mm. broad, the segments oblong; stamens 3.

Huánuco: (*Presl*). Mito, *1840*. Playapampa, 3,000 meters, *4481*.—Junín; La Merced, *5758*. Ranging to Colombia and Venezuela.

Dioscorea cubijensis Knuth, Notizbl. Bot. Gart. Berlin 7: 202. 1917; 129.

Similar to *D. trifoliata*, but the petioles and the nerves of the leaves beneath more or less setosely ciliate; flowers rather remote and sessile, minute, 1–1.5 mm. broad.

Loreto: Río Acre, Cubija, *Ule 9379*. Iquitos, *Tessmann 5359*.

Dioscorea dodecaneura Vell. Fl. Flum. 10: *pl. 123*. 1827; 249.

A glabrous vine with thin, cordate-ovate or orbicular, long-petioled, 9–11-nerved leaves and solitary or geminate, simple or laxly branched racemes; stamens 6; capsules 2 cm. long and 4 cm. broad.—Frequently grown in conservatories. *D. discolor* Knuth, slightly pubescent, the leaves purplish beneath, is scarcely distinct. —Illustrated, Pflanzenr. IV. 43: 249.

Loreto: Río Acre, *Ule 9177*.—Junín: Chanchamayo, *Raimondi* (det. Knuth as *D. discolor*).

Dioscorea elegans Knuth, Repert. Sp. Nov. 28: 83. 1930.

Very smooth, to 3 meters high, with simple, scarcely sulcate stems to 2 mm. thick; leaves cordate-ovate, to 7 cm. long and 5 cm. broad, contracted-acuminate, thin; spikes many in the axils, to 1.5 dm. long, the flowerless portion 3–4 cm. long; flowers sessile in glomerules of 2–4, crateriform, parted three-fourths of the way to the base, about 2.5 mm. long; stamens 3.—In shrubs.

Cuzco: Marcapata, 2,800 meters, *Weberbauer 7815*.

Dioscorea grandis Knuth, Notizbl. Bot. Gart. Berlin 7: 194. 1917; 105.

A robust, finally glabrate vine with deeply sulcate stems and large cordate-ovate leaves to 2 dm. long and nearly as broad, with lobes 7 cm. long; petioles (to 1 dm. long) and leaf nerves beneath scabrous; male inflorescence densely and somewhat viscidly puberulent; perianth segments lance-spatulate, 3–4 mm. long; stamens 6. Neg. 10522.

Puno: Sandía, 2,300 meters, *Weberbauer 629, 630.*

Dioscorea Haenkeana Presl, Rel. Haenk. 1: 135. 1827; 248.

Glabrous, with firm 9–11-nerved leaves about 2 dm. long and 17 cm. broad; male racemes much branched; perianth segments reflexed, the tube campanulate; stamens 6.—Perhaps a variety of *D. amazonum* Griseb., which probably will be found in Peru and which has somewhat smaller leaves, 8–15 cm. long and broad, and 7-nerved. Neg. 10451.

Peru: *Haenke.*

Dioscorea huallagensis Knuth, Repert. Sp. Nov. 29: 95. 1931.

Known only from a sterile specimen, but apparently of sect. *Lasiogyne* and related to *D. dodecaneura;* glabrous; stems 3 mm. thick; leaves 3–7 cm. distant, about 9 cm. long and 7.5 cm. wide, cordate, the base most obtusely incised to 1.2–1.7 cm., gradually narrowed to an acute acumen 1–1.2 cm. long, this usually dilated at the middle; petioles about 7 cm. long, 1.5 mm. thick.

Loreto: Yurimaguas, on the lower Río Huallaga, 135 meters (*Killip & Smith 27660*).

Dioscorea incayensis Knuth, Repert. Sp. Nov. 28: 85. 1930.

Among Peruvian species nearest *D. coriacea* but the racemes not floriferous below, on peduncles to 2 cm. long, often with the lower flowers male, the upper female, and the perianth 2 mm. broad, with ovate-lanceolate segments; filaments very fleshy; capsule 14 mm. long, 7.5 mm. broad.

Cuzco; Incay, valley of the Urubamba, 2,950 meters (*Herrera 2300, 2993*).—Cajamarca: Tambillo, Prov. Cutervo (*Raimondi 7248*).

Dioscorea iquitosensis Knuth, Repert. Sp. Nov. 29: 94. 1931.

Quite glabrous, with round stems 2 mm. thick; leaves 3–6 cm. remote, ovate-oblong, 5-nerved, often 6.5 cm. long and 3–5 cm. wide,

borne on petioles about 3 cm. long; female racemes solitary, to 27 cm. long, flowerless for 3–4 cm. above the base; capsules numerous, 27 mm. broad, 16 mm. long, the wings somewhat rounded; seed wing 12–13 mm. wide, the seed itself 3 mm. wide.—Sect. *Cryptantha.*

Loreto: Iquitos (*Killip & Smith 27315*).

Dioscorea Klugii Knuth, Repert. Sp. Nov. 30: 158. 1932.

A dark-stemmed vine with beautiful reticulate-veined parchment-like subrotund-ovate leaves to 12 cm. long and 8 cm. wide, abruptly caudate-acuminate; distinct nerves only 5; petioles rather slender, about 3 cm. long; male racemes simple, solitary, slender, 1.5 dm. long, closely flowered; flowers deep lilac, tubular, nearly 3 mm. long; stamens 6.

Loreto: Mishuyacu near Iquitos, *Klug 344.*

Dioscorea larecajensis Uline, Notizbl. Bot. Gart. Berlin 7: 195. 1917; 108.

A ligneous vine with glabrous angulate stems and ovate-acuminate, cordate-based, simply 9-nerved leaves about 1 dm. long and 6 cm. broad; male racemes mostly 3 in the axils, about equaling the leaves; perianth purple, 2.5 mm. wide; stamens 6; capsule deflexed, 8 mm. wide and twice as long.—There is a good illustration in Pflanzenr. IV. 43: 109.

Peru: *Ruiz.* Ecuador; Bolivia.

Dioscorea longirachis Knuth, Repert. Sp. Nov. 30: 159. 1932.

With flaccid angled stems and very thin leaves, the latter sometimes conspicuously but very evanescently pilose in youth; mature leaves cordate-oblong, acuminate, about 12 cm. long, 4–5 cm. wide, 5- or incompletely 7-nerved, glabrous, repandly and remotely subcrenate or entire; racemes solitary, simple, about 8-flowered, on a peduncle several cm. long; flowers greenish, when spread open 7 mm. wide; stamen column conspicuous.—Suggests *D. monadelpha* Griseb. and was once referred by the author to *D. Demourae* Uline (originally spelled *De Mourae*). The racemes of both these species are floriferous to near the base.

Cuzco: Marcapata Valley, 2,500 meters, *Weberbauer 7862.*

Dioscorea Macbrideana Knuth, Repert. Sp. Nov. 28: 87. 1930.

Glabrous and moderately tall, with subligneous slender purple stems 1 mm. thick, the internodes about 4 cm. long; leaves rather firm, cordate-ovate, 1 dm. long and 4–5 cm. broad; sinus of the leaves

to 1.5 cm. deep, somewhat rounded at the juncture with the purple petioles, these 1.5–2.5 cm. long; male inflorescence elongate, the remote simple spicate branches about 5 cm. long; flowers tiny; stamens three; fruiting racemes united into corymbs 1.5 dm. wide, 7–8 dm. long; capsules very numerous, 2 cm. broad, half as long, light brown; seeds with the wing 6 mm. wide, the wing itself half as broad.—On shaded shrubs.

Junín: La Merced, *5347*, type.—Loreto: Caballo-cocha, *Williams 2460*.

Dioscorea mitoensis Knuth, Repert. Sp. Nov. 28: 84. 1930.

Similar in aspect to *D. monadelpha*, but the leaves often larger, the pedicels to 1.5 cm. long, and the perianth segments broadly obovate.—A beautiful plant with large flowers borne gracefully on almost filiform pedicels.

Huánuco: Cani, near Mito, 2,700 meters, *3449*.

Dioscorea monadelpha Griseb. Kjøb. Vid. Medd. 164. 1875; 126. *D. lagoa-santa* Uline ex Knuth, Notizbl. Bot. Gart. Berlin 7: 201. 1917.

A glabrous or minutely puberulent vine with 8–9-nerved leaves varying from orbiculate-ovate to oblong and from broadly cordate to hastate at base, 7–8 cm. long and 5 cm. wide; flowers campanulate, greenish purple, 8 mm. broad, on long filiform pedicels; stamens 3, the fleshy filaments connate into a column 2–4 mm. high; capsule elliptic, 12–16 mm. long.—Well marked by the stamen structure. Knuth adopts Uline's name because of the existence of *Helmia monadelpha* Knuth, which is known correctly by another name.

Puno: Sandía, 3,000 meters, *Weberbauer 653*, *668a*.—Cuzco: Lares Valley, *Weberbauer 7902*. Bolivia; Brazil; Uruguay.

Dioscorea moyobambensis Knuth, Notizbl. Bot. Gart. Berlin 7: 185. 1917; 54.

A glabrous vine with terete slender stems and lance-ovate, abruptly and acutely acuminate leaves about 8 cm. long, openly cordate at base, the lobes about 1 cm. long; petioles often 4 cm. long; male spikes 2–3 in the axils; perianth subrotate, 3 mm. wide; stamens 6; capsule 2 cm. long and 8 mm. wide.—Flowers sordid violet; open savanna woods. *D. Traillii* Knuth is to be expected; its spikes are solitary and its flowers sessile. Neg. 10475.

San Martín: North of Moyobamba, 1,100 meters, *Weberbauer 4621*; 289.

Dioscorea nicolasensis Knuth, Repert. Sp. Nov. 29: 94. 1931.

Slender and glabrous-stemmed, but the leaf nerves beneath minutely puberulent; leaves 5–6 cm. distant, ovate-lanceolate, about 1 dm. long and half as wide, gradually and acutely acuminate, the petioles about 3 cm. long; male spikes 1–2, the upper corymbose, 1.5 dm. long; flowers solitary, 2–3 mm. distant; perianth subglobose, 1 mm. long, the ovate acutish lobes definitely longer than the stamens.—Thick woods. Sect. *Triapodandra.*

Junín: San Nicolás, 1,100 meters (*Killip & Smith 26075*, type). —San Martín: Tarapoto, *Williams 6146.*

Dioscorea Pavonii Uline ex Knuth, Notizbl. Bot. Gart. Berlin 7: 215. 1917; 243.

Similar to forms of *S. amarantoides,* but the thin, densely pellucid-punctate leaves obovate and shortly attenuate at base into a petiole only 3–5 mm. long; blades rounded at the obliquely mucronate tip, 4 cm. long, 2 cm. broad, 3-nerved; female spikes simple; perianth campanulate; style column very short. Neg. 10485.

Peru: *Pavón.*

Dioscorea perenensis Knuth, Repert. Sp. Nov. 29: 92. 1931.

Glabrous, the scarcely or not at all sulcate stems 4 mm. thick; leaves 9–15 cm. remote, glaucous, ovate, often 1.5 dm. long, 11 cm. broad, obtusely incised for 1.2–2 cm. at base, acute, 7–9-nerved; petioles often 4.5 cm. long; male spikes corymbed, 7–8 cm. long, flowerless for 1 cm. above base; verticels 2–5 mm. distant; perianth globose, 1–1.2 mm. broad; stamens 6.—Sect. *Sphaerantha.*

Junín: Colonia Perené, 680 meters (*Killip & Smith 25414*).

Dioscorea pinedensis Knuth, Repert. Sp. Nov. 29: 95. 1931.

Stems lightly sulcate, 4 mm. thick, glabrous; petioles 5–6 cm. long; leaves drying very thin, scabrous, puberulent on the nerves beneath or glabrous, elongate-triangular-hastate, often 14 cm. long, 5.5 cm. wide at the retuse (1 cm. deep) base slightly narrowed at the very acute tip; male inflorescence to 3 dm. long, the branches about 1 dm. long; flowers 2 mm. long, approximate; stamens 3; capsules to 2.5 cm. wide, 1.2–1.5 cm. long, the reddish yellow seed wing 6 mm. wide, the seed 2 mm.—Sect. *Struthantha.*

Junín: Río Pinedo, north of La Merced (*Killip & Smith 23610*), type.—Loreto: Yurimaguas, *Williams 7823.* Iquitos or near, *Williams 8096, 7994; Klug 968.*

Dioscorea piperifolia Humb. & Bonpl. ex Willd. Sp. Pl. 4: 795. 1806; 107. *D. maynensis* Kunth, Enum. 5: 357. 1850.

Allied to *D. larecajensis*, but the leaves 7–9-nerved, the male racemes often solitary and, particularly, the flowers on slender pedicels 5–8 mm. long.—The racemes are very lax. Weberbauer found the plant in a mixed formation of shrubs and herbs. See also *D. pozucoensis*, known only in fruit. Neg. 10530.

Loreto: Mainas, *Poeppig.*—San Martín: Tarapoto (*Spruce*).—Cajamarca: Below San Pablo, 2,250 meters, *Weberbauer 3852.* Colombia; Ecuador; Brazil.

Dioscorea polygonoides Humb. & Bonpl. ex Willd. Sp. Pl. 4: 795. 1806; 215.

Glabrous; stems subangulate, 2 mm. thick; leaves deeply but broadly cordate at base, medium-sized, 5–7-nerved or to 11-nerved on female plants; spikes usually simple, often 2 and sometimes 5 dm. long; perianth green; fertile stamens 3; capsule 2–2.5 cm. long, 2 cm. broad.—Male plants are characterized by the remote dense little glomerules of flowers on the elongate rachis.

Cajamarca: Cutervo, *Raimondi.*—Loreto: Mishuyacu, near Iquitos, *Klug 1088, 164.*

Dioscorea Poeppigii Kunth, Enum. 5: 365. 1850; 83.

A high-climbing glabrous liana with subangulate stems 6 mm. thick or thicker, and with large, deeply cordate (the basal lobes to 3.5 cm. long) leaves on petioles 6–7 cm. long; spikes solitary in the axils, 3–4 dm. long, much longer than the leaves; perianth subrotate, 5 mm. broad; stamens 6.—Compare *D. chagllaensis.* Neg. 10489.

Loreto: Mainas, *Poeppig 2356.*

Dioscorea pozucoensis Knuth, Repert. Sp. Nov. 28: 86. 1930.

Glabrous, high-climbing, the simple or branched stems 4 mm. thick, densely and minutely tuberculate; leaves firm, often 12 cm. long and about half as wide, oblong, shallowly cordate at base, rather abruptly contracted at apex to a mucronate tip 5 mm. long, with 9 subparallel nerves; petioles about 2 cm. long; fruiting racemes 2–3 dm. long, often united; capsule 3 cm. long and nearly 2 cm. broad; seeds 5 mm. long, 4 mm. wide, with a wing 2 mm. wide.—Flowers unknown. The name is from a modification of the locality name.

Huánuco: Posuso, 700 meters, *4641.*

Dioscorea putisensis Knuth, Repert. Sp. Nov. 28: 82. 1930.

A high-climbing, entirely glabrous vine with somewhat sulcate stems 2–3 mm. thick; leaves about 1 dm. distant, 1 dm. long, about 6 cm. broad, semilunate at base, very acutely acuminate; male racemes floriferous to base, often 1 dm. long, frequently many in the leaf axils and corymbose; flowers 2–2.5 mm. long, in verticels of 1–4, the pedicels 1–3 mm. long; stamens 6.—A member of the same group (sect. *Dematostemon*) as *D. tambillensis*.

Ayacucho: Putis, Choimacota Valley, 3,200 meters, *Weberbauer 7534, 7588*.

Dioscorea quispicanchensis Knuth, Repert. Sp. Nov. 29: 93. 1931.

Glabrous, the smooth stems scarcely 1 mm. thick; leaves 6–8 cm. distant, lanceolate, 4 cm. long, 1 cm. wide, narrowly incised for 2 mm. at base, gradually narrowed to the acute tip, on petioles only 3–5 mm. long; male racemes 4–7 cm. long, 1–2 in the axils, basally naked for 1–2 cm.; flowers solitary, 2–5 mm. distant, the filaments 5 mm. long, filiform; perianth stellately spreading, 4 mm. wide, the lanceolate lobes twice as long as the 3 stamens; female raceme 4 cm. long, the few capsules 1 cm. long, 6.5 mm. broad.—The type monoecious. Sect. *Cycladenium*.

Cuzco: Marcapata, Prov. Quispicanchi, *Weberbauer 7810*.

Dioscorea ramonensis Knuth, Repert. Sp. Nov. 29: 95. 1931.

Of the same section as *D. iquitosensis* and similar to that species, but the stems slightly angled, the leaves more lanceolate, to 10 cm. long and 4 cm. wide, usually with a mucro 3 mm. long, the racemes shorter, and the capsules smaller.

Junín: San Ramón (*Killip & Smith 24903*).

Dioscorea riparia Kunth & Schomb. in Kunth, Enum. 5: 364. 1850; 83.

Similar to *D. Poeppigii*, but the much smaller leaves rounded-truncate at base and the perianth 4 mm. broad.—Stems and especially the petioles slender. Neg. 10494.

Loreto: Río Acre, *Ule 9170*. Mainas, *Poeppig 2138*.—Without locality (*Pavón*). British Guiana; Brazil.

Dioscorea sandiensis Knuth, Notizbl. Bot. Gart. Berlin 7: 192. 1917; 56.

A tall slender vine with few if any branches and with cordate-lanceolate 7-nerved leaves about 7 cm. long; male spikes 1–1.5 dm. long, 1–3 in the axils; flowers sessile, campanulate, green, 2 mm. wide; stamens 6, the filaments connate.—In dense shrubs. Allied to *D. campestris* Griseb. (to be expected in Peru) with 5-nerved leaves. Neg. 10497.

Puno: Sandía, *Weberbauer 668.*

Dioscorea Stegelmanniana Knuth, Notizbl. Bot. Gart. Berlin 7: 203. 1917; 162.

A tall, robust, more or less densely puberulent-tomentose vine; leaves deeply cordate at base, about 1.5 dm. long and broad; flowers racemosely fasciculate in ample panicles; perianth 3 mm. long; stamens 6.—Allied to *D. trifida.* Illustrated, Pflanzenr. IV. 43: 163.

Loreto: Río Acre, *Ule 9178.*—Junín: La Merced, *Killip & Smith.*

Dioscorea syringaefolia Kunth & Schomb. ex Schomb. Faun. Fl. Guian. 1119. 1848; 107. *Helmia syringaefolia* Kunth, Enum. 5: 423. 1850.

Similar to *D. piperifolia* but the leaves often smaller and always firmer, the racemes strict, and the pedicels shorter.—The specimen cited is minutely scabrous on the leaf nerves beneath. Neg. 10542.

Cuzco: Marcapata Valley, *Weberbauer 7839.*

Dioscorea tambillensis Knuth, Repert. Sp. Nov. 28: 81. 1930.

Glabrous; leaves nearly coriaceous, deeply (1 cm.) cordate, slightly contracted at the obtuse mucronulate apex, often 11 cm. long, 7-nerved, the 3 middle nerves forming a lanceolate-ovate area; cross veins beneath slender; petioles often 2.5 mm. thick; male racemes to nearly 3 dm. long; flowers campanulate, 2 mm. long or longer; stamens 6, the filaments connate.—Related to *D. moyobambensis,* but the racemes often floriferous to the base.

Cajamarca: Tambillo, Prov. Cutervo (*Raimondi 3346*).

Dioscorea tarmensis Knuth, Notizbl. Bot. Gart. Berlin 7: 188. 1917; 60.

A relative of *D. moyobambensis* and *D. sandiensis;* petioles 1.5–2 cm. long; male spikes often numerous in each leaf axil; flowers pedicellate. Neg. 10505.

Junín: West of Huacapistana, 2,600 meters, *Weberbauer 2180.*

Dioscorea tayacajensis Knuth, Notizbl. Bot. Gart. Berlin 7: 212. 1917; 234.

A slender little-branched glabrous-stemmed vine with lanceolate-hastate, conspicuously 9-nerved leaves about 1 dm. long and half as wide; petioles filiform, 2.5–3.5 mm. long; perianth subcampanulate, 4–5 mm. broad; stamens 3; female spikes solitary; capsule about 1 cm. long and 6 mm. broad.

Huancavelica: Mantaro Valley, 2,200 meters, *Weberbauer 6445, 6566.*

Dioscorea trifida L. f. Suppl. Pl. 427. 1781; 158. *D. Ruiziana* Klotzsch ex Kunth, Enum. 5: 374. 1850.

This widely distributed species, well marked by its lobed leaves, is probably more common in Peru than the known collections indicate. In at least a part of its range its stems and tubers are the source of an arrow poison (Cheney).

Loreto: Yurimaguas, *Poeppig 2386.* Mishuyacu, *Klug 976, 1157, 1109.* Cashoboga, *Tessmann 5501.*—Huánuco: Chicoplaya, *Ruiz.* "Sacha papa," "cush-cush."

Dioscorea trifoliata HBK. Nov. Gen. & Sp. 1: 275. 1816; 129.

Leaves mostly trifoliolate; racemes simple or branched; male flowers shortly pediceled; anthers 3, minute; capsule oblong.—Probably represented in Peru only by the var. *amazonica* Knuth with flowers twice as large (about 5 mm. broad) as the type. The somewhat similar *D. crotalarifolia* Uline may be found in Peru; it has 6 stamens. Illustrated, Pflanzenr. IV. 43: 130.

Loreto: Río Acre, *Ule 9134, 9135.* Brazil; Venezuela.

Dioscorea trisecta Griseb. Kjøb. Vid. Medd. 159. 1875; 169.

Very well marked among the Peruvian species by its 3 small oblong-lanceolate acuminate leaflets and its tightly clustered flowers; petioles 2–4 mm. long; male spikes to 3 dm. long; stamens 6; capsules 3 cm. long, 2 cm. wide, obsoletely winged, the elliptic seeds winged all around. 258.

Loreto: Mainas (*Poeppig*). Yurimaguas, *Williams 7865.* Brazil.

Dioscorea Weberbaueri Knuth, Notizbl. Bot. Gart. Berlin 7: 205. 1917; 198.

A glabrous twining plant with almost filiform stems only a few dm. long; leaves about 1.5 cm. wide, cordate-lanceolate; male spikes often with a lateral branch at the base; flowers subsessile, greenish,

2–3.5 mm. wide; stamens 6.—In a dense society of shrubs and herbs. Illustrated, Pflanzenr. IV. 43. 198.

Cajamarca: Above San Pablo, 2,500 meters, *Weberbauer 3834;* 257.

Dioscorea Wittiana Knuth, Notizbl. Bot. Gart. Berlin 7: 194. 1917; 105.

Closely related to *D. grandis,* but the leaves sometimes 13 cm. long and 9 cm. wide and only 9-nerved, the sinus widely open; inflorescence glabrous or minutely pubescent; perianth segments shorter than 2 mm. Neg. 10546.

Loreto: Río Acre, *Ule 9169.*

32. IRIDACEAE. Iris Family

Reference: Baker, Handbook Irideae, 1892.

Iris pallida Lam. was collected by me as an escape, apparently established. Particularly the yellow-flowered Sisyrinchiums are conspicuous in May and June in the grass formations of middle (3,000–3,500 meters) elevations. Tigridias and probably other members of the family are said to be used for the dye they supply.

Segments of the flowers similar or not strongly dissimilar; style branches alternate with the anthers.

Bulbous plants.

Flowers white; style branches petaloid.....1. *Cipura.*

Flowers usually blue or greenish; style branches bifid. 2. *Nemastylis.*

Rhizomatous plants with more or less fleshy roots.

Perianth tube obsolete.

Capsules exserted; small, tufted or slender plants. 3. *Sisyrinchium.*

Capsules included; coarse plants.....4. *Orthrosanthus.*

Perianth tube developed.....5. *Symphyostemon.*

Segments of the flowers definitely dissimilar in size or shape; style branches opposite the anthers.

Style branches not winged, deeply divided.....6. *Tigridia.*

Style branches winged-lobed.....7. *Cypella.*

1. CIPURA Aubl.

Perianth tube obsolete, the outer segments spreading, the inner erect. Style branches alternate with the stamens. Stems simple,

bearing several small spathes with usually a number of very fugitive, pale lilac flowers in each one.

Cipura paludosa Aubl. Pl. Guian. 1: 38. *pl. 13*. 1775; 105.

Spathes sessile or nearly so, bracted by the upper leaves; inner perianth segments with 2 yellow blotches near the base.—Illustrated, Mart. Fl. Bras. 3, pt. 1: *pl. 64*.

Huánuco: Vitoc, *Ruiz*. Brazil to Cuba and Mexico.

2. NEMASTYLIS Nutt.

Bulbs with many brown coats. Stems leafy. Inflorescences 1–several, pedunculate, with 1–several pedicellate, evanescent, usually blue flowers. Perianth tube lacking. Stamens more or less united. Style branches bifid.

Flowers greenish, with purple dots..... *N. Huyanae.*

Flowers violet-blue, blue, or purple.

Filament column about as long as the anthers..... *N. Pearcei.*

Filament column very short..... *N. purruchucana.*

Nemastylis Huyanae Macbr. Field Mus. Bot. 11: 13. 1931.

Stems 1 to several dm. high, bulbous in the axil of the lowest leaf, usually simple, much shorter than the very long-acuminate lowest leaf; leaves 2; inflorescence terminal, simple, the flowers several; spathes subequal, acuminate, about 4–5 cm. long; flowers 1 cm. long; filament column a little shorter than the anthers which scarcely equal the style branches.—Named for King Huyana, father of the last kings of the Incas, Huascar and Atahuallpa. Moist rocky slopes.

Lima: Matucana, *469*, *829*(?).

Nemastylis Pearcei Baker, Handb. Irid. 114. 1892.

Usually several dm. high, often assurgent below, with 1 to several inflorescences and a number of long, strongly veined leaves; spathes 3 to often 5 cm. long, usually several-flowered; flowers about 2 cm. long, velvety, deep purple; style branches overtopping the anthers (typically) or shorter.—Perhaps more than one species, but fresh or formalin material is necessary. The leaves sometimes are a little longer than the stems. Grassy, often rocky hillsides.

Lima: Matucana, *355; 151*.—Huánuco: Northeast of Huánuco, *2155* (det. Diels). Mito, *3379;* (*Pearce 85*).—Cajamarca: Cascas,

Raimondi.—Amazonas: Bagua to Chachapoyas, *Raimondi.*—Cuzco: (*Herrera 555*). "Michi-michi," "supai-ttica."

Nemastylis purruchucana (Herb.) Benth. ex Baker, Handb. Irid. 114. 1892. *Gelasine purruchucana* Herb. Bot. Mag. 66: under *pl. 3779.* 1840.

Flowers about 2.5 cm. long; filament column very short; otherwise apparently like *N. Pearcei.*—Herbert named, under *Gelasine,* two varieties, one with leaf-like and the other with filiform bracts. He also credited the origin of *N. grandiflora* (Herb.) Benth. collected by Jameson in Ecuador, to Peru.

Lima: (*Mathews 784*). Lurín, 60 meters, *5988* (det. Diels).

3. SISYRINCHIUM L.

Slender short-rhizomatous herbs of grassy slopes, with usually narrowly 2-edged stems, grass-like leaves, and several, rarely solitary, pedicellate flowers exserted from a single spathe. Perianth tube nearly obsolete. Filaments free or somewhat united. Style rather long, the branches entire.—Species imperfectly known and distinguishable with difficulty, since few of the characters are always constant or easily discerned. So two keys follow, in an attempt to simplify identification according to condition of material.

Key to flowering specimens

Flowers deep to pale yellow throughout, often brown-veined.

Plants tall, 8–10 dm. high; leaves 7–8 mm. wide; flowers 17 mm. long.....*S. praealtum.*

Plants usually lower, leaves narrower, flowers smaller, or in one respect different from *S. praealtum.*

Filaments united into a column.

Spathes usually several-flowered; stems tall.

Stems flat, distinctly winged, often branched. *S. iridifolium.*

Stems terete or wiry, scarcely margined, strict. .*S. trinerve.*

Spathes 1–3-flowered; stems very short.

Flowers pedicellate; spathes acute, 6–8 mm. long. *S. pusillum.*

Flowers subsessile; spathes blunt, 4–5 mm. long. *S. brevipes.*

Filaments free nearly or quite to the base.
Stems broadly winged, with 1 to several leaves.
Leaves not ensiform or ribbed.....*S. convolutum.*
Leaves ensiform, ribbed.....*S. palmifolium.*
Stems narrowly if at all margined, usually leafless.
Stems fibrous-coated at base, tall.
Flower cluster terminal.....*S. Jamesonii.*
Flower cluster overtopped by the bract..*S. caespitificum.*
Fibers at base lacking; plant small.....*S. palustre.*
Flowers not yellow, unless at base, sometimes white.
Flower clusters often pseudo-lateral or leafy-bracted; plant rarely less than 1 dm. high, or the bract not greatly elongate.
Stems flat, narrowly margined.
Leaves flaccid; pedicels soon exserted.....*S. chilense.*
Leaves rigid; pedicels rarely exserted.....*S. rigidifolium.*
Stems terete, somewhat fistulose; leaves weak; pedicels soon exserted.....*S. junceum.*
Flower cluster terminal; alpine plants, rarely if ever 1 dm. high, or the bract 3–4-times exceeding the flower cluster.
S. porphyreum.

Key to sterile or fruiting specimens

Diminutive alpine species usually only a few cm. high.
Plants without fibers at base; pedicels well exserted...*S. palustre.*
Plants with fibers at base, or these sometimes few but the pedicels included or nearly so.
Spathes foliaceous.....*S. porphyreum.*
Spathes not foliaceous.
Flowers pedicellate; spathes acute, 6–8 mm. long.
S. pusillum.
Flowers subsessile; spathes blunt, 4–5 mm. long...*S. brevipes.*
Plants with well-developed stems, rarely as low as 1 dm.
Plants tall, 8–10 dm.; leaves 7–8 mm. wide; flowers 17 mm. long.
S. praealtum.
Plants usually lower, leaves narrower, flowers smaller, or in one respect different.
Stems flat or distinctly wing-margined, often branched.
Leaves ensiform, ribbed.....*S. palmifolium.*

Leaves neither ensiform nor distinctly nerve-ribbed.
Stems straight or nearly so; leaves firm.....*S. convolutum.*
Stems angled; leaves soft.....*S. iridifolium.*
Stems terete or flat and narrowly margined.
Stems wire-like, or flattened but the leaves flaccid.
Stems wire-like.
Stems not fibrous at base.....*S. junceum.*
Stems distinctly fibrous at base.....*S. trinerve.*
Stems flattened.....*S. chilense.*
Stems flattened and rigid, as also the leaves, very fibrous at base.
Bract not greatly elongate.
Leaves to 2 mm. wide.....*S. Jamesoni.*
Leaves to 3 mm. wide.....*S. rigidifolium.*
Bract greatly overtopping the flower cluster.
S. caespitificum.

Sisyrinchium brevipes Baker Handb. Irid. 130. 1892.

Stems very slender, subterete, leafless, 1 dm. long or less, nearly equaled by the narrowly linear leaves; spathes to 12 mm. long, the outer with a broad white edge; flowers yellow, 5 mm. long, the segments broad; filaments united.—Many fibers of old leaves present about the base of the plant. Steep grassy hillsides.

Junín: Río Blanco, *2978, 744* (det. Diels). Yauli, 4,400 meters, *Weberbauer 322* (det. Diels).—Cuzco: *Herrera 192.*

Sisyrinchium caespitificum Kränzl. Bot. Jahrb. 40: 242. 1908.

Densely tufted, with more or less of the old leaves evident about the base, the aspect juncaceous; stems 3.5 dm. high, the leaves to 2 dm. long; flower cluster exceeded by a linear pungent bract; flowers about 6, 5 mm. wide, the petals oblong; filaments free.—Compared by the author with *S. trinerve,* to which the Pearce specimen was originally referred by Baker, but later questioned. Doubtfully distinct from *S. Jamesoni,* unless by the more robust habit and elongate bract. Neg. 10879.

Ancash: Above Huarás, 4,000 meters, *Weberbauer 3089;* 226.—Huánuco: (*Pearce 87?*).

Sisyrinchium chilense Hook. Bot. Mag. 54: *pl. 2786.* 1827; 124.

Stems 2 to several dm. high, more or less angulate, narrowly winged above, with often 4–6, sometimes 12–20 winged peduncles,

each leafy-bracted; basal leaves soft, shorter; spathes 3–6-flowered; flowers lilac, with a yellow base, 12 mm. long; filaments united; capsules globose.—*S. azureum* Phil., reported by Hicken from Prov. Canchis, Cuzco, is probably this species, to which Baker referred Philippi's plant. The Peruvian plant usually has only 1–2 flower clusters. Collections cited all determined by Diels. 14.

Cuzco: Sacsahuamán, 3,500 meters, *Pennell 13595* (dwarf form; det. Diels); *Herrera 2355, 449.*—Without locality, *Pavón.*—Huánuco: Chinche, 3,450 meters, *1275.* Yanahuanca, 3,000 meters, *1241.* Mito, 2,700 meters, *1779, 3423.* Huariaca, 2,850 meters, *3115.*—Junín: Río Blanco, 4,500 meters, *805, 2967.*—Ayacucho: *Weberbauer 5503.*—Cajamarca: Cutervo, *Raimondi.* Mexico to Argentina and Chile. "Pfalco-ccollanan," "pascua-ccollanan."

Sisyrinchium convolutum Nocca, Pl. Select. Hort. Ticin. *pl. 1.* 1800; 128.

Stems about 3 dm. high, usually branched, longer than the weak basal leaves; spathes 2.5 cm. long; flowers 12 mm. long, bright yellow, brown-veined; anthers linear; capsule oblong.—A species well marked by the broadly winged stems, often 5 mm. wide.

Huánuco: Cani, near Mito, *3481* (det. Diels). Pillao, *Ruiz.*—Puno: Sandía, *Weberbauer 238.*—Junín: Huacapistana, 2,600 meters, *Weberbauer 2188* (det. Kränzlin).

Sisyrinchium iridifolium HBK. Nov. Gen. & Sp. 1: 324. 1816; 128.

One to several dm. high, with 2–3 branches and as many reduced leaves, the basal leaves weak and much shorter; spathes 4–6-flowered, 2.5–4 cm. long; flowers pale yellow, with brown veins, 12 mm. long; anthers small, oblong; capsule turbinate. Neg. 10887.

Cajamarca: *Raimondi.*—Huánuco: (*Haenke*). Chinchao, *Ruiz.*—Ayacucho: Pampalca, 3,200 meters, *Killip & Smith 23261*(?). Widely distributed in South America.

Sisyrinchium Jamesoni Baker, Journ. Bot. 14: 269. 1876; 126.

Densely tufted, with narrow stems winged above, to 2 dm. high, rather longer than the linear rigid leaves; spathes 2–4-flowered, the outer over 2.5 cm. long; flowers 8 mm. long; capsule oblong.

Cuzco: Cuzco, 3,600 meters, *Herrera 2392, 2356.* Ecuador.

Sisyrinchium junceum E. Mey. ex Presl, Rel. Haenk. 1: 118. 1827; 123. *S. Weberbauerianum* Kränzl. Bot. Jahrb. 40: 240. 1908.

Stems 3–6 dm. long, ending in a long whip-like bract subtending one sessile or several peduncled flower clusters; basal leaves 2–3; spathes narrow, often less than 2 cm. long, few- to many-flowered; flowers 8–12 mm. long, rose-red or white, more or less nodding; elongate filaments connate; capsule globose.—Hicken has recorded *S. scirpiforme* Poepp. from Prov. Canchis, Cuzco, but that species seems referable here. A very slender, flaccid plant, often of moist rocky places. All specimens determined by Diels.

Moquehua: Carumas, 3,200 meters, *Weberbauer 7297*.—Lima: Matucana, *430, 2952*. Viso, *618*. Weberbauer, 170.—Junín: Río Blanco, *642, 992, 2994; Killip & Smith 21550*. Weberbauer, 177. Between Tarma and La Oroya, *Weberbauer 2541*, type of *S. Weberbauerianum*. Chile, Bolivia, Argentina.

Sisyrinchium palmifolium L. Mant. 1: 122. 1767; 132.

Vigorous and very well marked by its ensiform leaves, tall, broadly winged stems often 8 mm. wide, and its fascicled clusters of large flowers, all subtended by a rather large, bifid bract; leaves about 6 mm. broad, many-ribbed, rigid; spathes 2.5 cm. long; flowers pale yellow, 12–18 mm. long; filaments connate only at base; capsule subglobose.

Ayacucho: Pampalca, 3,200 meters, *Killip & Smith 22220*.—Cuzco: Cerro de Cusilluyoc, *Pennell 14124* (det. Diels).—Huánuco: (*Haenke*). Mito, *1786* (det. Diels). Huánuco Mountains, *2156* (det. Diels).—Junín: Palca, *Weberbauer 1773* (det. Kränzlin); 247, 249. Colombia to Patagonia.

Sisyrinchium palustre Diels, Field Mus. Bot. 8: 79. 1930.

Only a few cm. high, with rosulate-crowded leaves, very broadly vaginate, 3–7 cm. long; spathe 1.5 cm. long; flowers pale yellow, 2–5, the slender pedicels exserted 1 cm.; stamens free except at base.—In wet uplands.

Huánuco: Chasqui, *3308*.

Sisyrinchium porphyreum Kränzl. Bot. Jahrb. 40: 240. 1908.

A little plant a few cm. high with 2 leaves 4–6 cm. long and 2–3 flowers 7 mm. long in a spathe 5 cm. long; filaments united, 2.5–3 mm. long, the anthers as long or shorter. Neg. 10897.

Junín: Yauli, 4,400 meters, *Weberbauer 321;* 220.

Sisyrinchium praealtum Kränzl. Repert. Sp. Nov. 13: 119. 1914.

Tall, 8–10 dm. high, with many long-acuminate grass-like leaves, 4–6 dm. long, 7–8 mm. broad; scape leafless, terete below; flowers 3–4, about 17 mm. long, the oblong petals 5 mm. wide; filaments and anthers subequal, 4 mm. long, the former more or less united.—The outer spathe is acuminately produced to 15 cm., the inner being a third shorter. Perhaps a luxuriant state of a species already described.

Apurímac: Between Río Pinco and Río Apurímac, 3,500 meters, *Weberbauer 5862*.

Sisyrinchium pusillum HBK. Nov. Gen. & Sp. 1: 323. 1816; 125.

A tufted little plant, usually less than 5 cm. high, with numerous narrow leaves a few cm. long and a 1-flowered spathe 8–12 mm. long, somewhat exceeded by the bract; flowers 4–6 mm. long, the narrow segments acutish.—Reported from Mejía, Arequipa, at 200 meters (*Günther & Buchtien 342*), certainly a doubtful record. Raimondi recorded its use, internally and externally, as a remedy for syphilis.

Junín: Yauli, 4,400 meters, *Weberbauer 366* (det. Kränzlin); 83, 220. Río Blanco, *2998* (det. Diels).—Ayacucho: Huanta, *Raimondi*. Ecuador. "Hunajusma."

Sisyrinchium rigidifolium Baker, Handb. Irid. 131. 1892.

Tufted, with many old leaf fibers; stems slender, wiry, leafless, to about 2 dm. high, the rigid leaves shorter; stem extended as a terete bract, typically several cm. long, above the 1–2 flower clusters; spathes 3–4-flowered; flowers 8 mm. long; filaments free; capsule oblong, torulose.—This was described from material past flowering. The bract of the Weberbauer specimens, with flowers, is only 1 cm. longer than the inflorescence. The bases of old stems and leaves persist in abundance. Neg. 10899.

Puno: Pucará, 3,700 meters, *Weberbauer 426* (det. Kränzlin); 186. Bolivia.

Sisyrinchium trinerve Baker, Journ. Bot. 14: 267. 1876; 122.

Stem simple, slender, rigid, terete, 3 dm. high, the single flower cluster overtopped by a linear subulate bract; leaves rigid, subterete, about as long as the stem; spathes 2–3-flowered, linear-lanceolate, not white-edged, 2–3.5 cm. long; flowers 6–8 mm. long; capsule oblong. Neg. 10902.

Junín: Río Blanco, *3008* (vel aff., det. Diels). Huacapistana, *Weberbauer 1* (det. Kränzl.). Bolivia.

4. ORTHROSANTHUS Sweet

Very much like a gigantic *Sisyrinchium* except that the capsules are included in the spathe. Style very short.—Rather coarse, vigorous plants with very firm stems and leaves from short stout rootstocks. Tufted plants of upland grasslands.

Orthrosanthus chimboracensis (HBK.) Baker, Gard. Chron. II. 6: 67. 1876. *Moraea chimboracensis* HBK. Nov. Gen. & Sp. 1: 322. 1816. *M. gladioloides* HBK. loc. cit.

Stems often many dm. high, the scarcely shorter, rigid leaves basal except 1 or 2 greatly reduced ones; inflorescences often numerous, racemose, paniculate; spathes 3–4-flowered, less than 2.5 cm. long; perianth blue, with a short tube and oblong segments about 12 mm. long, the stamens half as long.—Illustrated, Bot. Mag. 143: *pl. 8731.*

Huánuco: Mito, *3374, 1659* (det. Diels).—Cajamarca: (*Humboldt*).—Junín: Palca, Huacapistana, 3,000–3,500 meters, *Weberbauer 2429;* 248, 249, 252. North to Mexico.

Orthrosanthus Ocisapunga Ruiz ex Diels, Pflanzenfam. ed. 2. 15a: 478. 1930. *Sisyrinchium Oncissapungum* Ruiz ex Klatt, Linnaea 34: 736. 1866, nomen.

Similar but lower, the flowers always solitary and usually white.

Huánuco: Mito, *1785* (det. Diels). Above Huánuco, *2151* (det. Diels).—Huancavelica: *Raimondi* (det. Diels).—Cuzco: Paucartambo, *Herrera 927.* Bolivia.

5. SYMPHYOSTEMON Miers

Ours a small herb a few cm. high from fascicled fibrous roots. Spathe several-flowered. Perianth tube well developed. Filaments united at the base.

Symphyostemon album Kränzl. Bot. Jahrb. 40: 242. 1908.

Diminutive, the very short stem clothed with the old leaf remains; leaves rigid, acuminate, 4 cm. long, 2 mm. wide; flowers white, with a median lilac vein, to 2 cm. long and 1.5 cm. wide, the segments obovate-triangular.—The similar *S. acaule* (Klatt) Benth. has blue flowers with oblong lobes.

Junín: Yauli, 4,400 meters, *Weberbauer 345*; 221, 309.

6. TIGRIDIA Juss.

Hydrotaenia Lindl. Bot. Reg. 24: Misc. 69. 1838; 28: *pl. 39.* 1842.

Bulbous, with round stems and 1–2 few-flowered pedunculate spathes. Perianth segments unequal. Style branches deeply divided and more or less recurving, shorter than the anthers. Filaments more or less joined. Capsule elongate.

Tigridia grandiflora (Cav.) Diels, Pflanzenfam. ed. 2. 15a: 497. 1930. *Sisyrinchium grandiflorum* Cav. Diss. 6: 345. *pl. 192.* 1788. *T. lutea* Link, Kl. & Otto, Icon. 85. *pl. 34.* 1841. *T. Pavonia* Ker ex Konig & Sims, Anan. Bot. 1: 246. 1805.

Stems 2–4 dm. high, with 2–3 distant plicate linear leaves sometimes 2 dm. long; spathe to 5 cm. long; flowers light yellow with violet dots, to 3 cm. broad, the segments roundish, clawed, spreading.

Arequipa: Arequipa, *Raimondi* (det. Diels).—Lima: Amancaes Hills, *Weberbauer.* Chancai, *Ruiz.* Chile.

Tigridia lobata (Herb.) Macbr. Field Mus. Bot. 11: 13. 1931. *Hydrotaenia lobata* Herb. Bot. Reg. 30: Misc. 66. 1844.

Similar to the preceding but apparently distinct; flowers campanulate, the oblong-cuneate segments suberect, densely brown-spotted at base.

Lima: (*Maclean*); Weberbauer, 146.

7. CYPELLA Herb.

Bulbous plants similar to *Tigridia,* but the spathes often several, the blossoms 1–3, and, particularly, the often irregularly lobed or winged styles or style branches overtopping the anthers.

Flowers bright yellow or somewhat brown and violet-banded; leaves lanceolate.....*C. peruviana.*

Flowers blue, violet, or purple; leaves linear or nearly so.

Stems flexible or very short, equaled or exceeded by the leaves; spathe bracts acute.

Stems well developed.....*C. cyrtophylla.*

Stems very short, the leaves greatly elongate.....*C. Hoppii.*

Stems stiff, scarcely flexible; spathe bracts long-acuminate. *C. Herrerae.*

Cypella cyrtophylla (Johnst.) Diels, Pflanzenfam. ed. 2. 15a: 498. 1930. *Mastigostyla cyrtophylla* Johnst. Contr. Gray Herb. 81: 85. 1928.

Stems 1–3 dm. high, often with 2 forks; leaves 3–4, the lower 1–4 dm. long, 2–4 mm. broad; outer bracts 2–3 cm. long, acute; flowers violet-blue, sometimes with darker spots, the lobes connate below, the outer ones 3 cm. long, the much narrower inner ones half as long; filaments united below; capsule 1 cm. long and half as thick; seeds brown, 2–2.5 mm. long, dull, undulate-rugose and very densely and minutely tuberculate.—Johnston proposed his genus on the basis of the wing-margined styles and the curious decurrent wing-like flagellum.

Arequipa: Chichani (*Hinkley 16*). Above Arequipa, 2,500 meters, *Pennell 13172, 13173, 13180, 13173a.* Yura, *Weberbauer 6838.*

Cypella Herrerae Diels, ined.

Apparently near *C. cyrtophylla,* but probably distinct. Neg. 11093.

Cuzco: Sacsahuamán, 3,500 meters, *Herrera 2348; Pennell 13570.*

Cypella Hoppii Diels, ined.

This little plant with very long leaves, apparently sprawling on the ground, seems to be a very distinct species. Neg. 11094.

Arequipa: *Hopp.*—Tacna: Candarave, *Weberbauer 7387.*

Cypella peruviana Baker, Bot. Mag. 102: *pl. 6213.* 1876; 65.

Leaves 2–3, lanceolate, very plicate; stems terete, about 3 dm. long, with 1 or 2 flower clusters; spathes 3–4 cm. long, the green ventricose valves subequal; flowers bright yellow, the outer segments broadly obovate-cuneate, about 3.5 cm. long, the lighter yellow claws densely brown-spotted; inner segments pilose and ridged medially, the broad blade deflexed, the cuneate claw concave; style crests 2, flat, petaloid, with a small intermediate tooth.

Cuzco: *Weberbauer 5884* (det. Kränzlin).—Huancavelica: Río San Bernardino, *Weberbauer 6579* (det. Kränzlin).—Junín: Río Blanco, 4,500 meters, *3046.* Bolivia(?).

34. MUSACEAE. Banana Family

Reference: Schumann, Pflanzenr. IV. 45. 1900.

No species of banana (*Musa*) is native to Peru but *M. paradisiaca* L. (Weberbauer 298, 299) is frequently cultivated, as well as several varieties or other species, some of which are especially delicious. Spruce recorded the native name "pacova" or "bacove," and Poeppig (Reise 2: 375) listed a number of varieties with their Indian

names. However, in Peru the common Spanish name is "plátano." Martinet, Jard. Bot. Lima 51. 1873, lists the more common sorts as "plátano guineo," "plátano lugo," "plátano de la isla," and "mieja" or "plátano de Taití," to which list Herrera has noted as additions (for *M. paradisiaca*) "colorado," "brasilero," "palillo," "pama," "dominico," "ordinario," "artate-bellaco," and "capón," and (for *M. sapientum*) "enano," "pera," "seda," "imperial" and "morado."

These are very definitely divisible into two species, one edible fresh and the other edible only after cooking (*M. sapientum* L.). The latter has been treated as only a variety of the soft-fruited *M. paradisiaca* L.

The striking Amazonian plant, *Ravenala guianensis* (L. C. Rich.) Benth., may be found in Peru. Its long-petioled leaves, the leaf blades often 1 meter long, and large white flowers distinguish it readily from any *Heliconia*.

1. HELICONIA L.

Banana-like or canna-like plants of sunny and low or wet forest, with the flowers in a compound inflorescence subtended by large cymbiform colored bracts, the colors often gay and variegated.—The determination of herbarium material is difficult unless the color of the bracts and flowers, which at present is considered constant for each species, has been noted by the collector, as well as the size or habit of the plant. With the accumulation of more collections accompanied by careful color observations, the number of species may be reduced, as suggested by the color variations exhibited in *H. Schumanniana*. The generic name has been conserved.

Inflorescence covered with an inordinately long pubescence. *H. vellerigera.*

Inflorescence glabrous, or pubescent or villous in some part.

A. Stout plants, generally 1 to several meters high, the leaves often 5 dm. long or much longer.

Bracts broadly ovate-lanceolate.

Bracts densely imbricate, deciduous..... *H. episcopalis.*

Bracts scarcely imbricate, persistent.

Bracts tapering and acute.

Pedicels and rachis both distinctly pubescent; bracts acuminate or acute.

Leaves over 1 meter long; bracts red throughout.

Bracts not ciliate..... *H. penduloides.*

Bracts densely villous-ciliate..... *H. pruinosa.*

Leaves about 6 dm. long; bracts green-margined. *H. rostrata.*

Pedicels and usually the rachis glabrous; bracts tapering-acuminate.

Rachis also glabrous; bracts distant..... *H. Bihai.*

Rachis strigillose; bracts contiguous..... *H. stricta.*

Bracts blunt..... *H. Standleyi.*

Bracts (relatively) narrowly lanceolate.

Inflorescence erect.

Rachis glabrous; bracts red or scarlet.

Rachis straight; bracts scarlet..... *H. variegata.*

Rachis flexuous; bracts red..... *H. acuminata.*

Rachis pubescent; bracts reddish yellow or red above.

Bracts acuminate, mostly about 1 dm. long. *H. brasiliensis.*

Bracts rounded to apex, mostly 1.5–2 dm. long. *H. lingulata.*

Inflorescence pendulous or nodding.

Bracts not scarlet, the lower usually much exceeding 1 dm.

Rachis glabrous; bracts yellow, at least below.

Bracts red-tipped; leaves lustrous..... *H. subulata.*

Bracts not red-tipped; leaves glaucous, especially beneath..... *H. Weberbaueri.*

Rachis pubescent; bracts reddish yellow.. *H. lingulata.*

Bracts scarlet, even the lowest only 1 dm. long .. *H. affinis.*

A. Slender plants, canna-like, rarely over 1 meter high, the leaves usually about 3 dm. long, or shorter.

Lower bracts longer than 1 dm.

Flowers greenish yellow, black-spotted at tip; inflorescence dense even in fruit, the bracts ascending... *H. densiflora.*

Flowers not black-spotted; inflorescence open, the bracts soon widely spreading.

Rachis straight or nearly so.

Rachis densely puberulent, as also bracts and flowers.

Inflorescence open, reddish-puberulent; sheaths glabrous..... *H. roseoflava.*

Inflorescence close, hirsutulous or villous; sheaths often villous..... *H. hirsuta.*

Rachis glabrous.

Bracts in part rose; flowers orange..... *H. aureorosea.*

Bracts scarlet; flowers yellowish green... *H. variegata.*

Rachis definitely flexuous.

Pedicels about 2 cm. long; flowers reddish.. *H. acuminata.*

Pedicels about 1 cm. long; flowers yellow... *H. affinis.*

Lower bracts rarely 1 dm. long, even the lowest, unless leaf-like, or rarely in *H. psittacorum* with narrow leaves.

Bracts orange; greenish yellow flowers black-tipped; leaves oblong-lanceolate, acuminate; plants glabrous. *H. psittacorum.*

Bracts not orange nor flowers black-tipped; leaves elliptic or ovate-lanceolate.

Plants glabrous; bracts purple, red and yellow, or red.

Bracts and flowers purple, the latter 12 or more in each bract..... *H. Uleana.*

Bracts and flowers red or yellow or the flowers purple but few to several.

Leaves 4–6 dm. long and 1 dm. wide, shortly acuminate. *H. affinis.*

Leaves smaller, caudate-acuminate.

Inflorescence open, the bracts 1.5–2.5 cm. remote.

Leaves oblongish, 4 to rarely 7 cm. wide. *H. Schumanniana.*

Leaves elliptic, 7–9 cm. wide..... *H. aureorosea.*

Inflorescence close, the bracts mostly about 1 cm. remote.

Petioles about 1 dm. long..... *H. tenebrosa.*

Petioles about 1 cm. long..... *H. cannoidea.*

Plants not glabrous; peduncles and often flowers pubescent; bracts scarlet..... *H. hirsuta.*

Heliconia acuminata L. C. Rich. Nov. Act. Acad. Nat. Cur. 15: Suppl. 26: *pl. 11, 12.* 1831; 38.

Plants 2 meters high or higher, glabrous, with oblong long-petioled leaves and a long and strict inflorescence with a strongly flexuous rachis; bracts red, remote, the lower 12–17 cm. long; pedicels 2 cm. long or longer; flowers reddish green.—The Peruvian material determined by Loesener, with remark "vel aff." The Ecuadorian *H. aequatoriensis* Loes. might be sought here; its lowest bracts are leaf-like, the lower proper ones 1.5–2.5 dm. long. Neg. 9937.

San Martín: Moyobamba, *Weberbauer 4664*.—Huánuco: Huamalíes, *Weberbauer 3558*. Cueva Grande near Posuso, 1,050 meters, *4802*.—Junín: Chanchamayo Valley, 1,500 meters, *Schunke 386, 278*. —Loreto: Río Acre, *Ule 9188*. Brazil to Venezuela and the Guianas.

Heliconia affinis Loes. Bot. Jahrb. 54: Beibl. 117: 10. 1916.

Glabrous and low, but the leaves sometimes nearly 6 dm. long; inflorescence curved at base (pendulous?), the rachis flexuous; bracts scarlet, the lowest 1 dm. long; flowers yellow, 4 cm. long, the pedicels 8–13 mm. long,—Allied to *H. densiflora*. Neg. 9939.

Puno: Chunchosmayo, 900 meters, *Weberbauer 1169*.

Heliconia aureorosea Loes. Bot. Jahrb. 54: Beibl. 117: 11. 1916.

Glabrous, with sessile or subsessile leaves, rounded at base, 2–2.5 dm. long, and 7–9 cm. wide, long-acuminate; inflorescence suberect, the lower bracts yellow and paler toward the apex, the upper, especially above, rose-color, 10.5–4.5 cm. long; pedicels 8–14 mm. long; flowers curved at base, 2 cm. long.—The specific name was hyphenated by the author. Neg. 9940.

Loreto: Río Acre, *Ule 9183*.

Heliconia Bihai L. Mant. 2: 211. 1771; 36.

Vigorous and tall, the long-petioled oblong leaves to 1.3 meters long, the inflorescence to 6 dm. long and half as wide, glabrous throughout; bracts scarlet, with long narrow acuminate yellow tips, to 1.5 dm. long; flowers green, or yellow and green-tipped.—Widely distributed and commonly cultivated.

Huánuco: Huamalíes, *Weberbauer 3636* (det. Loesener).—Loreto: Río Acre, *Ule 9190* (det. Loesener). La Victoria, *Williams 3098*.

Heliconia brasiliensis Hook. Exot. Fl. 3: *pl. 190*. 1827; 38.

Similar to *H. acuminata*, but the lower bracts to sometimes 22 cm. long, red at apex, and the rachis pubescent; flowers greenish white or greenish yellow or red.

Huánuco: Pampayacu, *5080.*—Loreto: Leticia, *Ule 6911* (or aff., det. Loesener). Iquitos, *Williams 1377, 3718, 3709, 1242; Klug 172.* Brazil to the Guianas. "Bijanillo," "situlli," "uchpa-situlli."

Heliconia cannoidea L. C. Rich. Nov. Act. Acad. Nat. Cur. 15: Suppl. 24: *pl. 9.* 1831; 39.

This has been referred to *H. hirsuta* as a variety by Baker, but as species of *Heliconia* are accepted at present, it seems to merit recognition, as indicated in the key.

Loreto: Río Itaya, *Williams 31.* Mishuyacu, *Klug 308.* Fortaleza, Yurimaguas, *Williams 4343.* Santa Rosa, *Williams 4840.* Recreo, *Williams 3923.* Yurimaguas, *Killip & Smith 27569.*

Heliconia densiflora Verlot, Rev. Hort. 274. 1869; 39.

About 6 dm. tall, with long-petioled oblong leaves, cordate at base, and a dense inflorescence of about 6 lustrous scarlet bracts, the lowest 1.5 dm. long.—Said to grow in Peru (originally from French Guiana), and with the greenish yellow flowers, black-spotted at tip, of *H. psittacorum.* Illustrated, loc. cit.

Peru: Without data.

Heliconia episcopalis Vell. Fl. Flum. 3: *pl. 22.* 1827; text, ed. Netto 109. 1881; 35.

Tall, with a strict erect inflorescence of yellowish red bracts, sometimes 6–7 cm. long, and pale lilac flowers; rachis light-colored.—Often 3–4 meters high. Illustrated, Mart. Fl. Bras. 3, pt. 3: *pl. 2.*

Huánuco: Huamalíes, *Weberbauer 3598* (det. Loesener).—Loreto: (*Huber*). Río Acre, *Ule 9534* (det. Loesener). Brazil; Colombia.

Heliconia hirsuta L. f. Suppl. Pl. 158. 1781; 39. *Limnocharis Haenkei* Presl, Rel. Haenk. 1: 88. 1827.

About 1 meter high, with oblong, sessile or subsessile leaves; inflorescence, including the yellow flowers, pubescent.—Rarely the leaf sheath also is villous, var. *villosula* Loes.

Junín: La Merced, *5363; Weberbauer 1811* (det. Loesener). Chanchamayo Valley, *Schunke 403.*—San Martín: Tarapoto, *Ule 6312* (det. Loesener).—Loreto: Cerro de Canchahuayo (*Huber 1385*). Río Acre, *Ule 9187.* Yurimaguas (*Poeppig 2183*); *Williams 3902, 3896.* Ranging to Colombia.

Heliconia lingulata R. & P. Fl. 3: 71. *pl. 304.* 1802; 38.

Resembling *H. brasiliensis,* but the obtuse bracts, even the lowest, less than 2 dm. long; flowers yellow.—Recent authors have described

the inflorescence as erect, although, as shown in the plate and as the original description indicates, it may be pendulous.

Huánuco: Río Monzón, *Weberbauer 3579* (det. Loesener). Chinchao and Cochero (*Ruiz & Pavón*). "Purum-kcagni," "purum-kcagne."

Heliconia penduloides Loes. Bot. Jahrb. 54: Beibl. 117: 6. 1916.

About 3 meters high, with long-petioled leaves nearly 2.5 dm. wide that are strongly white-pruinose beneath as also the upper portion of the bracts; inflorescence pendulous, to 8 dm. long; peduncle and rachis densely villous; bracts glabrous without except at base, the lowest nearly 3 dm. long; pedicels 2 cm. long; flowers yellow, the outer parts pubescent.—The related *H. pendula* Wawra of Brazil is not pruinose and has glabrous flowers. Neg. 9944.

Huánuco: Valley of the Mairo, 500 meters, *Weberbauer 6759*.

Heliconia pruinosa Loes. Bot. Jahrb. 54: Beibl. 117: 7. 1916.

Similar to *H. penduloides*, but the inflorescence erect, and the largest villous bracts less than 2 dm. long. Neg. 9945.

Puno: Near Chunchosmayo, 900 meters, *Weberbauer 1216*.

Heliconia psittacorum L. f. Suppl. Pl. 158. 1781; 39.

With the habit and flowers of *H. densiflora*, but the leaves cuneate or subrotund at the base, and the largest bracts only 8 cm. long.—Illustrated, Mart. Fl. Bras. 3, pt. 3: *pl. 7*.

Loreto: Timbuchi, *Williams 987*. Caballo-cocha, *Williams 2198*. Santa Ana, *Williams 1228*. Generally distributed in South America. "Bijauillo."

Heliconia roseoflava Loes. Bot. Jahrb. 54: Beibl. 117: 10. 1916.

Leaves about 3 dm. long, long-petioled, cuneate at base; bracts puberulent, glabrous within, the largest 17 cm. long, rose with yellowish and whitish tips; pedicels to 12 mm. long, puberulent like the orange flowers, these 5 cm. long.—Allied to *H. densiflora*. The name was hyphenated originally. Neg. 9946.

Loreto: Río Acre, *Ule 9184*.

Heliconia rostrata R. & P. Fl. 3: 71. *pl. 305*. 1902; 36. *H. Poeppigiana* Eichl. in Mart. Fl. Bras. 3, pt. 3: 18. 1890.

Sometimes 2.5 meters high; leaves subcordate at base; inflorescence 3 dm. long and half as broad; bracts 1 dm. long; flowers yellow.—This doubtless included formerly several of the recently proposed

segregates, such as *H. penduloides* Loes. The somewhat similar *H. juruana* Loes. may be expected; its bracts are only half as long.

Junín: La Merced, *Weberbauer 1851, 5110.*—Huánuco: Pillao, Cochero, Chinchao, Panao, Muña, Posuso (*Ruiz & Pavón*). Cochero (*Poeppig 1567*). Pampayacu, 1,050 meters, *5110.*—Loreto: Fortaleza, Yurimaguas, *Williams 4380.* Río Acre, *Ule 9189.* "Kcagni," "kcagne."

Heliconia Schumanniana Loes. Bot. Jahrb. 54: Beibl. 117: 12. 1916. *H. Schumanniana* var. *basirubra* Loes. op. cit. 13.

A glabrous plant, about 1 meter high, or sometimes 3 meters, but the leaves small, less than 3 dm. long and only 4–7 cm. wide, obtuse or cuneate at base and long-acuminate at apex; inflorescence erect or ascending, with a flexuous or nearly straight rachis; lowest bracts leaf-like, the lowest proper bracts 6–8 cm. long, red below, yellow above; flowers yellow, 2 cm. long.—Allied by the author to *H. aureorosea* and *H. Uleana.* This species, at least, varies in color: f. *apicirubra* (Loes.) Macbr., bracts yellow below the middle, scarlet above; f. *acreana* (Loes.) Macbr., flowers purple. Neg. 9948.

Huánuco: Between the Monzón and the Huallaga, 600 meters, *Weberbauer 3703.*—San Martín: Moyobamba, 1,000 meters, *Weberbauer 4627.*—Loreto: Río Itaya, *Williams 3427.* Río Acre, *Ule 9186.* "Bijanillo."

Heliconia Standleyi Macbr. Field Mus. Bot. 11: 48. 1931.

A magnificent, entirely glabrous plant, the stems at least 2 meters high, the leaves even longer, on petioles more than half as long, and the drooping inflorescence sometimes nearly 2 meters long; rachis strongly flexuous; bracts 2–4 cm. remote, to 1 dm. long, 3–3.5 cm. wide below, and 1 cm. wide just below the subobtuse tip; pedicels many, about 1 cm. long.

Loreto: Iquitos, *Killip & Smith 27444,* type.

Heliconia stricta Huber, Bol. Mus. Goeldi 4: 543. 1906.

Commonly 1.5 meters high; petioles glabrous, 3–4 dm. long; leaves to 1 meter long and 2 dm. wide, at base strongly unequal, contracted to the petiole, acuminate; rachis strict, minutely strigillose; bracts 6–8, cymbiform, to 6 cm. wide at insertion, 1–1.5 dm. long or longer, acuminate, green; flowers many; pedicels and ovaries glabrous; flowers 6 cm. long, white below, green above.

Loreto: Cerro de Canchahuayo (*Huber*). "Citolle."

Heliconia subulata R. & P. Fl. 3: 70. *pl. 303*. 1802; 39. *H. psittacorum* L. f. var. *subulata* Baker, Ann. Bot. 7: 199. 1893.

A robust plant, the leaves often exceeding 1 meter; inflorescence curved, becoming reflexed; bracts yellow with red tips, in fruit puniceous; flowers many, 16–33 in each bract, on short angled pedicels, attenuate to base; flowers yellow.

Huánuco: Chinchao, Cochero, Chacahuasi, Posuso, and Iscutuna (*Ruiz & Pavón*). "Puca-kcagni."

Heliconia tenebrosa Macbr. Field Mus. Bot. 11: 48. 1931.

Slender, especially the long lustrous petioles 1.5–2 dm. long; leaves deep green, long-acuminate, 7–8 cm. wide, 2.5 dm. long; inflorescence erect, 2 dm. long; lowest bracts 7–8 cm. long, 1.5 cm. wide at base, strongly narrowed toward the acute tip, about 1 cm. remote; rachis very flexuous; flowers 3 cm. long; stamens free, exserted; anthers 5 mm. long.

Loreto: Mishuyacu, *Klug 1089*, type.

Heliconia Uleana Loes. Bot. Jahrb. 54: Beibl. 117: 12. 1916.

Nearly *H. Schumanniana*, but the leaves distinctly elliptic, about 2 dm. long and 7–10 cm. broad, and both the bracts and flowers dull purple.—Neg. 9949.

Loreto: Río Acre, *Ule 9185*.

Heliconia variegata Loes. Bot. Jahrb. 54: Beibl. 117: 9. 1916.

Similar to *H. acuminata*, but the slender rachis straight; flowers yellowish greenish. Neg. 9950.

Huánuco: Posuso, 1,000 meters, *Weberbauer 6766*, type; 600 meters, *4708*. Pampayacu, 1,050 meters, *5068*.

Heliconia vellerigera Poepp. Reise 2: 295. 1836; 37.

One species that can not be mistaken, because the inflorescence is literally covered with a dense, long, brownish red pubescence.—Weberbauer, collecting the plant for the second time, noted its height as 6 meters and its flowers as yellow. Neg. 1186.

Huánuco: Posuso, *Weberbauer 6764* (det. Loesener).

Heliconia Weberbaueri Loes. Bot. Jahrb. 54: Beibl. 117: 10. 1916.

Apparently very similar to *H. subulata* and perhaps only a form; bracts yellow throughout, the lower 15–21 cm. long; flowers yellow,

on pedicels 1–2 cm. long.—Compared by the author with *H. lingulata*. Neg. 9951.

Ayacucho: Río Apurímac, 600 meters, *Weberbauer 5628*.

35. ZINGIBERACEAE. Ginger Family

Reference: Schumann, Pflanzenr. IV. 46. 1904.

This family, interesting for its well-known products such as ginger, turmeric, and cardamon, is represented in Peru by no native species of economic importance, but the ornamental *Hedychium coronarium* Koen. of the Himalayas, frequently cultivated, has sometimes escaped to grow as wild. It has ample oblong-lanceolate leaves and densely bracteate spikes of pure white flowers, the tube to 8 cm. long and the segments spreading, the lower lip broad and notched. It is pictured by Schumann, op. cit. *f. 8*. Tessmann found it at Iquitos, as "la flor desgraciada," Williams at San Roque, as "Navidad sacha," and Herrera at Calca. *Zingiber officinale* Roscoe, the source of ginger, is sometimes an escape, as *Klug 1227* from Iquitos. Known as "gengibre," it is recognizable by its small head of densely bracted, red and yellow flowers, the bracts dark-dotted, on a leafless but sheath-bracted stalk. The leaves are linear-acuminate.

Corolla lip short and more or less definitely 3-lobed . . . 1. *Renealmia*.

Corolla lip prominent and obovate or elliptic, entire, crisped, or 2-lobed.

Flowers in dense spikes.

Bracteoles complicate, not bicarinate; corolla lip more or less 2-lobed . . . . . 2. *Costus*.

Bracteoles tubular or bicarinate; corolla lip merely crisped. 3. *Dimerocostus*.

Flowers solitary, axillary . . . . . 4. *Monocostus*.

1. RENEALMIA L. f.

Simple-stemmed perennials from a fleshy aromatic rhizome, the distichous leaves linear to elliptic-lanceolate, the inflorescence paniculate or racemose, the flowers solitary or several in the often colored subtending bracts. Calyx tubular or turbinate, at anthesis rupturing laterally or more or less regularly, with 3 lobes. Corolla tube often shorter than the calyx. Lateral staminodia tooth-like. Stamen sessile or subsessile.—The species possess good habital differences and collectors should note whether the inflorescence is basal or terminal. As so few specimens show clearly the habit, the follow-

ing key is based on less important characters that suffice, however, to distinguish the Peruvian species.

Inflorescence very dense in flower, rarely 1 dm. long.
- Leaves huge; bracts densely fulvous-puberulent. *R. nicolaioides.*
- Leaves small to medium; bracts glabrous or lightly puberulent but not conspicuously so.
  - Bracts firm, ovate-lanceolate, acute.
    - Bracts 1-flowered, broadly lanceolate, crowded.... *R. cernua.*
    - Bracts several-flowered, narrowly lanceolate, loose. *R. hygrophila.*
  - Bracts soft, more or less crinkled in drying, rounded or obtusish.
    - Lower bracts remote (1–2 cm. distant)..... *R. breviscapa.*
    - Lower bracts imbricate or touching.
      - Bracts glabrous or glabrate; leaves rarely 2.5 dm. long. *R. geostachys.*
      - Bracts more or less pubescent; leaves mostly several dm. long..... *R. thyrsoidea.*

Inflorescence relatively open even in flower, a narrow elongate raceme or spike-like panicle, usually at least 1.5 dm. long.
- Inflorescence minutely stellate-pubescent..... *R. micrantha.*
- Inflorescence glabrate or puberulent.
  - Inflorescence red or reddish, the bracts oblong-lanceolate.
    - Flowers small, 1 cm. long or less.
      - Bracts several- to many-flowered..... *R. occidentalis.*
      - Bracts 1-flowered..... *R. Regnelliana.*
    - Flowers large, about 2 cm. long or longer.
      - Bracts lance-acuminate, 4 cm. long..... *R. macrantha.*
      - Bracts ovate-acute, 2–2.5 cm. long..... *R. lativagina.*
  - Inflorescence pale, the bracts suborbicular..... *R. spicata.*

Renealmia breviscapa Poepp. & Endl. Nov. Gen. & Sp. 2: 25. *pl. 135.* 1838; 300. *R. racemosa* Poepp. & Endl. op. cit. 26. *Amomum racemosum* R. & P. Fl. 1: 2. *pl. 1.* 1798. *Alpinia Ruitziana* Steud. Nom. ed. 2. 1: 63. 1840. *Renealmia Ruiziana* Horan. (as to name), Prodr. Scit. 33. 1862.

Glabrous except for the subtomentose peduncle, pedicels, and rachis, the stems about 6 dm. high, the leaves to 2.5 dm. long, on petioles to 6 cm. long; panicle pyramidal, the peduncle to 2.5 dm. long;

bracts red, ovate-lanceolate, acute, 2 cm. long (as the calyx); corolla yellow, the lobes scarcely 8 mm. long, the lip subtrilobed-ovate; capsule 1 cm. long, to 12-seeded.—*R. floribunda* Schum., with cylindrical panicle and smaller capsule, and *R. oligosperma* Schum., with calyx 1 cm. long and fewer seeds, may be found.

Huánuco: Pampayacu, *Poeppig.* Cochero, Chinchao, Muña, and Pillao (*Ruiz & Pavón*).—Junín: La Merced, *Weberbauer 1805* (det. Loesener).—San Martín: Tarapoto, *Ule 6605.*—Loreto: Río Acre, *Ule 9199* (det. Loesener). "Achira de monte."

Renealmia cernua (Sw.) Macbr. Field Mus. Bot. 11: 14. 1931. *Costus cernuus* Sw. ex R. & S. Syst. Veg. 1: 25. 1817. *R. strobilifera* Poepp. & Endl. Nov. Gen. & Sp. 2: 26. *pl. 136.* 1838.

About 2 meters high, with sessile lanceolate leaves to 3 dm. long and 6 cm. wide, and ovate or ellipsoid, terminal spikes; bracts indurate, orange, the fertile densely imbricate, lanceolate, 4 cm. long; tube of the coriaceous yellow corolla obtuse.—An unusual species with the aspect of *Costus.*

Loreto: Yurimaguas, *Poeppig 2182; Williams 4116, 5234.* Colombia; Venezuela; Costa Rica; Surinam.

Renealmia geostachys Schum. Pflanzenr. IV. 46: 303. 1904.

Glabrous except the hirsute corolla lip, about 1 meter high; leaves lance-oblong, the petioles 5–12 mm. long, thick, the ligule scarcely 1 mm. long, truncate; racemes elongate-ellipsoid, obtuse, about 1 dm. long; corolla yellow, the tube 1.5 cm. long, the lobes 1 cm. long. Neg. 9919.

Loreto: Leticia, *Ule 6188.* San Antonio, Alto Río Itaya, *Williams 3468*(?).

Renealmia hygrophila Schum. Pflanzenr. IV. 46: 284. 1904.

A robust perennial with the aspect of *R. cernua,* but the bracts linear-lanceolate, acuminate, and loosely subtending 3–4 flowers. Neg. 9923.

Loreto: Mouth of Río Santiago, *Tessmann 4676.* Colombia. "Mishipanga."

Renealmia lativagina Macbr. Field Mus. Bot. 11: 50. 1931.

Robust, to 2 meters tall or taller, the basal inflorescence closely enveloped below with conspicuous sheaths 1–2 dm. long and 2.5–3 cm. wide on each side; leaves long-petioled, 8 dm. long and 2 dm. wide; flowers solitary, 3 cm. long, pale red; bracts salmon-pink,

oblong-obovate, acute; fruit red.—A specimen by Williams (*3113*) from La Victoria, consisting of a leaf blade and the upper portion of an inflorescence, would be sought here. It has nearly sessile flowers scarcely 2 cm. long, calyx 15 mm. long, and obtusish bracts 12 mm. broad. It could be *R. goyazensis* Schum., *R. latebracteata* Loes., or new.

Loreto: Iquitos, *Killip & Smith 27099*. Caballo-cocha, *Williams 2174*(?; specimen incomplete).

Renealmia macrantha Poepp. & Endl. Nov. Gen. & Sp. 2: 25. *pl. 134*. 1838; 306.

One meter high or taller, with sublanceolate leaves sessile but long-attenuate at base; racemes red, to 3 dm. long, the peduncles subtomentose; bracts lance-acuminate, to 4 cm. long; calyx clavate-tubular, 2 cm. long; corolla yellow, the obovate lip puberulent at the middle.

San Martín: Tocache, *Poeppig*. Loreto: Iquitos, *Williams 3591*. "Mishqui-panque."

Renealmia micrantha Schum. Pflanzenr. IV. 46: 298. 1904. *Amomum racemosum* R. & P. Fl. 1: 2. 1798, in part. *R. Ruiziana* (Steud.) Horan. Prodr. Scit. 33. 1862, acc. to Loesener.

A stout perennial with sessile or subsessile, thick, glabrous, oblong-lanceolate leaves 3–3.5 dm. long or longer and 7–10 cm. wide; peduncle about 6 dm. long; panicle 2 dm. long; bracts lance-acuminate; flowers little longer than the tomentulose pedicels.—Remarkable because of its stellate pubescence. According to Loesener, Notizbl. Bot. Gart. Berlin 11: 87. 1931, the Madrid specimen of Ruiz & Pavón is partly this plant and partly *R. breviscapa*. The Steudel name, however, as a name, applies only to the latter, which is the earlier available for *A. racemosum* R. & P., not (L.) A. Rich. My specimens were from open hillside thickets; plants 2 meters high with basal inflorescence. The flowers were orange, the black fruits orange within. Neg. 9935.

Huánuco: Pampayacu, *5100*. Chinchao, etc., *Ruiz*.

Renealmia nicolaioides Loes. Notizbl. Bot. Gart. Berlin 10: 65. 1927.

A magnificent banana-like perennial attaining 5 meters, with huge leaves exceeding 1.2 meters, bearing its flowers on separate scapes; spikes at first head-like, 6 cm. long, becoming 3 dm. long in fruit;

bracts 4.5–6 cm. long; flowers red.—Unique in the genus for its easily disjoined stamen structure. Neg. 9928.

Huánuco: By the Monzón, 900 meters, *Weberbauer 3435*.

Renealmia occidentalis (Sw.) Sweet, Hort. Brit. ed. 2. 493. 1830. *Alpinia occidentalis* Sw. Prodr. 11. 1788.

Stout and glabrous (except the rachis), with sessile or subsessile leaves often several dm. long and about 1 dm. broad; bracts reddish, lanceolate-acute, many-flowered; calyx scarlet, 5–6 mm. long, the tube of the yellow corolla slightly exserted.

San Martín: Moyobamba, *Weberbauer 4513* (det. Loesener).

Renealmia Regnelliana Loes. Notizbl. Bot. Gart. Berlin 10: 66. 1927.

A small plant, the leaves about 3 dm. long and 6–7 cm. wide, shortly acuminate, and the basal inflorescence only 2 dm. long; lowest bracts imbricate; pedicels 6 mm. long, lightly rusty-pubescent, like the bracts and sepals, especially at tip, the former 2–2.5 cm. long, the latter 1 cm. long; flowers inconspicuous. Neg. 9932.

Loreto: Yurimaguas, *Williams 5245*. Brazil. "Mishqui panga."

Renealmia spicata Gagnepain, Bull. Soc. Bot. France 49: 27. 1902; 298.

A species with sessile or shortly petioled, abruptly acuminate leaves and a dense cylindrical spike-like panicle about 1 dm. long; bracts suborbicular, 7–10 mm. wide, deciduous; calyx campanulate, coriaceous, irregularly lobed; middle lobe of corolla lip emarginate.

Peru: (*Gay*).—Loreto: Río Acre, *Ule 9200* (?; det. Loesener).

Renealmia thyrsoidea (R. & P.) Poepp. & Endl. Nov. Gen. & Sp. 2: 26. 1838; 302. *Amomum thyrsoideum* R. & P. Fl. 1: 2. *pl. 2.* 1798.

Stout, 2 meters high; leaves subsessile; bracts lanceolate, to 3 cm. long, the calyx 1.5 cm. long; capsule ellipsoid, nearly 4 cm. long. —Otherwise about like *R. geostachys*.

Huánuco: Cochero, Chinchao, Posuso, *Ruiz*. Cushi, *4814*.—Junín: La Merced *5243; Weberbauer 1835* (det. Loes.); *Killip & Smith 23447*.

2. COSTUS L.

Similar to *Renealmia*, but not aromatic and the leaves spirally disposed, the corolla lip enlarged, and the lateral staminodia often

lacking. Filament sometimes petaloid. Inflorescence usually strobilate, the bracts 1–2-flowered. Ovary 3-celled. Bracteoles complicate.—Besides the following, a specimen from Tarapoto (*Ule 6475*) has been referred to the often cultivated Asian *C. speciosus* (Koenig) Smith (or aff. det Loesener), a species distinguishable from all ours by its distinctly pungent-mucronate bracts. But in aspect, at least, this particular Ule specimen suggests *C. Ulei* Loes.!

A. Leaves pubescent beneath, at least on the nerves, sometimes minutely so but uniformly.

B. Stems well developed.

Leaves silvery beneath with a dense appressed silky pubescence. *C. argenteus.*

Leaves more or less pubescent, at least beneath, but not strikingly silvery.

Plants densely villous throughout, except the inner bracts, with spreading reddish hairs.

Bracts unappendaged..... *C. lasius.*

Bracts appendaged..... *C. scaber.*

Plants in part glabrate, or the pubescence fine and appressed or subappressed or sparse (or the bracts appendaged).

Leaves usually sparsely villous above; bracts all more or less appendaged..... *C. scaber.*

Leaves glabrous or glabrate above; bracts not definitely appendaged (sometimes softer at tips or acute).

Leaves puberulent beneath, the hairs appressed or minute.

Stout herbs, the flowering stalks 2 cm. thick or thicker, even above..... *C. cylindricus.*

Slender herbs, the stems 1–1.5 cm. thick.

Bracts broadly ovate, rounded-acutish. *C. Puchucupanga.*

Bracts narrow, acuminate..... *C. Ulei.*

Leaves sparsely hirsute on both sides, the hairs straggling.

Leaves elongate-oblong..... *C. tarapotensis.*

Leaves broadly ovate..... *C. amazonicus.*

B. Stemless plant with rosulate leaves..... *C. kaempferoides.*

A. Leaves glabrous.

Bracts narrow, acute or acuminate.

Bracts callous-lineate; spikes sessile, terminal....*C. tarmicus.*

Bracts not calloused; spikes nodding or lateral....*C. cernuus.*

Bracts broad, rounded or, if acutish, not tapering.

Plants slender, linear-leaved, or flexuous-stemmed, the stems about 0.5 cm. thick.

Leaves ovate.

Ligule cobwebby-pubescent.....*C. spiralis.*

Ligule glabrous or nearly so.....*C. gracilis.*

Leaves linear-lanceolate.....*C. zingiberoides.*

Plants stout, the stiff stems about 1 cm. thick or thicker.

Bracts not callous-lineate or, if obscurely, manifestly appendaged.

Bracts neither appendaged nor lineate; leaves green. *C. erythrocoryne.*

Bracts manifestly appendaged, obscurely lineate; leaves purple beneath.....*C. erythrophyllus.*

Bracts calloused, not appendaged, unless sometimes the outermost.

Flowering stalks leafy, the spikes often short.

Spikes cylindrical, sometimes short; callus line evident.

Ligule rounded, or at any rate not ciliate, sometimes hairy.

Leaves mostly less than 1.5 dm. long; flowers white. *C. validus.*

Leaves mostly 2–3 dm. long; flowers mostly yellow or reddish.....*C. cylindricus.*

Ligule truncate, arachnoid-ciliate.....*C. brasiliensis.*

Spikes ovoid-turbinate; callus line very prominent. *C. laevis.*

Flowering stalks leafless, closely bracteate.

Ligule eciliate; bracts and flowers red..*C. erythrothyrsus.*

Ligule arachnoid-ciliate; bracts green or red, the flowers white or variegated.....*C. brasiliensis.*

Costus amazonicus (Loes.) Macbr. Field Mus. Bot. 11: 13. 1931. *Costus Malortieanus* Wendl. var. *amazonicus* Loes. Notizbl. Bot. Gart. Berlin 10: 710. 1929.

Hirsute, especially the leaf margins, and with broad (about 2 dm.) leaves to 3.5 dm. long, glaucous beneath; spikes ellipsoid, to 1.5 dm. long; bracts broadly ovate, callous-lineate, sparsely pilose, the margin obscurely lacerate; flowers large. Neg. 9904.

Loreto: Tierra Blanca, on the lower Marañón, *Tessmann 4903*.

Costus argenteus R. & P. Fl. 1: 3. *pl. 4*. 1798; 389.

Sometimes 1 meter high; leaves glabrous above, to 3 dm. long and 4–5 cm. broad, narrowed to a subcordate base, the petiole 3 mm. long; ligules 7–8 mm. long, the margins lanuginose-ciliate; spikes terminal, finally elongate-cylindrical, with red ovate soft-appendaged bracts, the lower leaf-like, 1 dm. long and 3–4 cm. wide; calyx turbinate; corolla yellowish (?).—Loesener, Notizbl. Bot. Gart. Berlin 11: 91–92. 1931, has established the true character of this long misunderstood species.

Huánuco: Cochero and Chinchao (*Ruiz & Pavón*).—Junín: Chanchamayo Valley, 1,200 meters, *Schunke 384* (fide Loesener). "Purum-piña."

Costus brasiliensis Schum. Pflanzenr. IV. 46: 403. 1904. *C. arabicus* Vell. Fl. Flum. 1: *pl. 5*. 1827; text, ed. Netto 2(?). 1881.

Allied to *C. cylindricus*, but the leaves commonly smaller, the ligule twice as long (3–5 mm.), and the firmer reddish bracts usually drying darker and 3–4 cm. long; corolla tube to 1.5 cm. long, the lip to 6 cm. long.—*C. congestiflorus* Gagnp., to which Loesener doubtfully refers *Ule 9198* from Río Acre (or to *C. lanceolatus* Peters), would key here. It has oblongish bracts 2 mm. long and villous flowers.

Loreto: Iquitos, *Tessmann 3699* (vel aff., det. Loesener). Caballococha, *Williams 2497* (vel aff.). Brazil.

Costus cylindricus Jacq. Fragm. 54. *pl. 77*. 1809.

Similar to *C. scaber*, but the slightly petioled leaves glabrous or somewhat pilose and usually longer (1.5–3 dm. long), and the bracts often longer.—The typical form has spikes 1 dm. long or shorter, red bracts, and yellow flowers. Our material is probably all the var. *pulcherrima* (Kuntze) Schum. (var. *acreanus* Loes. Notizbl. Bot. Gart. Berlin 10: 712. 1929, apparently), more robust, the spikes to 1.5 dm. long, the bracts tomentulose, and the flowers rose or yellow. Illustrated, Pflanzenr. IV. 46: 380.

Junín: La Merced, *4809; Schunke 435*.—Loreto: Middle Ucayali, *Tessmann 3292*. Iquitos, *Killip & Smith 27266*. Río Acre, *Ule*

9194, 9193, 9195 (var. *acreanus*). Bolivia to the West Indies. "Cañagre."

Costus erythrocoryne Schum. Pflanzenr. IV. 46: 410. 1904.

Leaves 18–28 cm. long, 7–9 cm. wide, the margins and nerves beneath minutely appressed-pilose; ligule 6–7 mm. long, ciliate; spikes ellipsoid, rounded at apex, 1–1.5 dm. long; bracts red, tomentose and ciliate, very broadly ovate, 4–5 cm. long and broad, not at all calloused; calyx 1.5 cm. long; flowers yellow, red toward the tip; corolla lip obovate, obtuse, 3.5–4 cm. long.—Well marked by the diverse flowering stems, virtually stout-bracteate peduncles, 3–9 dm. high. The similar *C. geothyrsus* Schum. of Ecuador, with leaves twice as large, is to be expected. Neg. 9892.

Loreto: Iquitos, *Ule 6188.*

Costus erythrophyllus Loes. Notizbl. Bot. Gart. Berlin 10: 707. 1929.

Glabrous except the puberulent bracts, several dm. to 1 meter high; leaves mostly crowded toward the apex of the stem, shortly petioled, obovate-oblong, 1.5–2.5 dm. by 5.5–10 cm.; spikes subcapitate, 4.5 cm. long, 3.5 cm. thick; smaller bracts 4 cm. long, the appendage half as long; flowers yellowish with reddish streaks.—Leaves reddish beneath. Related to *C. juruanus* Schum. and *C. discolor* Schum., both with shorter and entire ligules. Neg. 9890.

Loreto: Mouth of the Apaga, *Tessmann 4813.*

Costus erythrothyrsus Loes. Notizbl. Bot. Gart. Berlin 10: 713. 1929.

Allied to *C. erythrocoryne,* but glabrous, the leaves 3–4 dm. long, the bracts 3–4 cm. long and 2.5–3 cm. broad, and the flowers red.—The Ecuadorian *C. geothyrsus* Schum. has leaves 2 dm. broad and hairy bracts, and probably will be found in Peru. Neg. 9891.

Loreto: Mouth of Río Santiago, *Tessmann 4262.* Timbuchi, Río Nanay, *Williams 977.* "Cañagre colorado."

Costus gracilis Loes. Notizbl. Bot. Gart. Berlin 10: 711. 1929.

Slender, the ascending stems to 3.5 mm. thick, glabrous, or the sheaths granulate-punctate; petioles 2–3 mm. long; leaves 8–12 cm. long and 1.5 cm. wide; bracts, excluding the lower, more or less leaflike ones, about 22 mm. long and 8 mm. broad, with an obsolete callus line; flowers white.—Allied by Loesener to *C. pubescens* S. Moore, of Brazil. Neg. 9897.

Loreto: Río Acre, *Ule 95 bis.*

Costus kaempferoides Loes. Notizbl. Bot. Gart. Berlin 10: 714. 1929.

The only stemless species of Peru; leaves about 3 dm. long and 1 dm. wide, sparsely hirsute on both sides; spikes 6 cm. long and broad; flowers yellow. Neg. 9899.

Loreto: Río Acre, *Ule 9197*.

Costus laevis R. & P. Fl. 1: 3. 1798; 400. *C. Weberbaueri* Loes. Notizbl. Bot. Gart. Berlin 10: 712. 1929.

Petioles to 1 cm. long; sheath broad, puberulent; ligule and petioles purple; spikes very long, fusiform, the bracts broadly lanceolate; flowers large and showy, the elongate obtuse lobes puberulent, the middle lobe of the ample lip trifid. Neg. 9900.

Huánuco: Pillao (*Ruiz & Pavón*). Cochero (*Poeppig 1587*).—Junín: La Merced, *Weberbauer 1852, 1820* (the same as the R. & P. plant, fide Loesener).

Costus lasius Loes. Notizbl. Bot. Gart. Berlin 10: 710. 1929.

Striking because of its reddish pubescence; spikes ovoid, sessile; corolla yellowish, the oblong lobes 6 cm. long, the lip to 9 cm. long.—This was referred to *C. villosissimus* Jacq., of the West Indies, by Schumann. Neg. 9901.

Puno: Sangabán (*Lechler 2475?*).—Loreto: Leticia, *Ule 6180*, type. Yurimaguas, *Poeppig*. La Victoria, *Williams 3004*.

Costus Puchucupanga Macbr. Field Mus. Bot. 11: 49. 1931.

Rather slender, the rusty-puberulent stems 1 cm. thick; sheath margins densely woolly-ciliate; leaves sessile, narrowed to the base, shortly caudate-acuminate, 2–2.5 dm. long, 7–10 cm. wide, glabrous above except the margins and midnerve, these densely fulvous-pubescent, finely pale-puberulent all over beneath; spike ovoid, sessile; bracts broad, rounded, conspicuously callous-lineate; flowers unknown.

Loreto: Yurimaguas, *Williams 4570*. "Puchucu-panga."

Costus scaber R. & P. Fl. 1: 2. *pl. 3;* 406.

Recognizable by its pubescent leaves, the larger about 8 cm. long and 7 cm. broad; bracts also hairy, purple, 2 cm. long, with a callus line below the apex.—The species is not well named.

Huánuco: Pillao, Chinchao, Cochero, Posuso (*Ruiz & Pavón*).—Loreto: Cumaría, *Tessmann 3324* (det. Loesener). Puerto Meléndez,

Tessmann 4781 (vel aff., very pubescent, det. Loesener). Mishuyacu, *Klug 790, 922.* Palta-cocha, Río Nanay, *Williams 1272.*

Costus spiralis (Jacq.) Rosc. Trans. Linn. Soc. 8: 350. 1807; 400. *Alpinia spiralis* Jacq. Hort. Schoenbr. 1. *pl. 1.* 1797.

A rather well-marked species because of the obviously woolly-ciliate ligules, the usually slender stems, and, especially, the short corolla lip; leaves small, usually 1.5 dm. long and a third as broad; spikes 2–5 cm. long, the bracts villous-margined to glabrate (our form); corolla red, the tube 1 cm. long, the stamen far exceeding the short lip.

Loreto: Timbuchi, Río Nanay, *Williams 968, 772.* "Agrio-wiru." South America.

Costus tarapotensis Macbr. Field Mus. Bot. 11: 50. 1931.

Habit unknown; leaves oblong-lanceolate, narrowed at both ends, acuminate, about 3 dm. long and 6 cm. wide, glabrous above but conspicuously rusty-villous beneath, very thin; spikes ovoid, about 1 dm. long; bracts glabrous, oblongish, acute, to 5 cm. long and 7 mm. wide, soft toward the tips; flowers 2 cm. long.—Probably related to *C. amazonicus.*

San Martín: Tarapoto, *Williams 6529.*

Costus tarmicus Loes. Notizbl. Bot. Gart. Berlin 10: 709. 1929.

More or less lightly pubescent, about 3 meters high; petioles 3–8 mm. long; leaves 1.5–2.5 dm. long, 2.5–6 cm. wide; spikes 5.5–7.5 cm. long and 3.5–4.5 cm. thick; bracts glabrous, obsoletely or conspicuously calloused, the upper scarious; flowers 6.5 cm. long, the lip reddish-bordered. Neg. 9993.

Junín: La Merced, 900 meters, *Weberbauer 1856.*

Costus Ulei Loes. Notizbl. Bot. Gart. Berlin 10: 709. 1929.

Similar to the preceding, but more or less yellowish-pubescent; bracts purple, the acumen of the upper 1 cm. long. Neg. 9914.

Loreto: Río Acre, *Ule 9192.*

Costus validus Loes. Notizbl. Bot. Gart. Berlin 10: 711. 1929.

Apparently very near *C. brasiliensis;* bracts rigid-coriaceous, the obtuse or rounded apex somewhat incised. Neg. 9915.

Loreto: Río Acre, *Ule 9196.*

Costus zingiberoides Macbr. Field Mus. Bot. 11: 49. 1931.

By its slender stems, only 5–6 mm. thick, its almost grass-like leaves 1.5–2 dm. long and 12–15 mm. broad, and its small (to 10 cm. long, 2.5 cm. thick) heads with orange-red bracts, this species is readily known; the leaves are glabrous, the sheaths hirsutulous; bracts ovate, striate, puberulent or glabrous, the faint callus to 4 mm. long; bracteoles hyaline, truncate, 7 mm. long; calyx 22 mm. long; corolla deep yellow, 3 cm. long; connective petaloid; ovary 3-celled.—In aspect suggesting *Zingiber officinale.*

Loreto: Yurimaguas, *Williams 3985* (type), *3924.*

3. DIMEROCOSTUS Kuntze

Flowers in dense spikes, the bracteoles and calyces rigidly coriaceus. Bracts more or less sheath-like. Ovary 2-celled.

Leaves glabrous or minutely puberulent beneath.

Bracteoles entire or nearly so.

Leaves nearly glabrous; bracts not long-pubescent.

Bracts conspicuously calloused, entire.....*D. Tessmanni.*

Bracts obscurely calloused, toothed.....*D. Williamsi.*

Leaves puberulent beneath; flowers white; bracts cobwebby-pubescent.....*D. uniflorus.*

Bracteoles deeply fissured; flowers yellow.....*D. elongatus.*

Leaves appressed silvery-pubescent beneath.....*D. bicolor.*

Dimerocostus bicolor Macbr. Field Mus. Bot. 8: 114. 1930.

Similar to *D. uniflorus,* but the shortly petioled leaves with a very dense, silvery indument beneath of almost microscopic hairs; flowers unknown; seeds subquadrate, lustrous black.—Plants 2 meters high; inflorescence greenish white. In shady ravine.

Huánuco: Vilcabamba, Río Chinchao, *5001.*

Dimerocostus elongatus Huber, Bol. Mus. Goeldi 4: 545. 1906.

Leaves minutely puberulent beneath; calyx nearly 4 cm. long; spikes 3 dm. long or often longer; bracteoles cleft one-third to one-fourth, bicarinate; flowers yellow, with a bright sulphur-yellow lip.

Loreto: Cerro de Canchahuayo and Pampa del Sacramento (*Huber 1384, 1461*).

Dimerocostus Tessmanni Loes. Notizbl. Bot. Gart. Berlin 10: 715. 1929.

Leaves glabrous except near the midrib beneath, to 6 dm. long and nearly 1 dm. wide; calyx 3.5–4 cm. long; spikes 2.5 dm. long, the bracts 3 cm. long, with a callus line 4–6 mm. long, proceeding from the 3-cornered apex.—Also collected at Chicoplaya by Ruiz and Pavón (Loesener). Neg. 9888.

Loreto: Parinari, *Tessmann 3751*. Yurimaguas, *Williams 4472*. "Nunio uaskanan," "sacha huiro."

Dimerocostus uniflorus (Poepp.) Schum. Pflanzenr. IV. 46: 427. 1904. *Costus uniflorus* Poepp. ex Peters. in Mart. Fl. Bras. 3, pt. 3: 58. 1890.

Robust, several meters high; leaves green on both sides but minutely puberulent beneath; bracts long-ciliate; bractlets 2–3 cm. long, bicarinate, pubescent; calyx 2.5–3 cm. long; corolla lip 6–7 cm. long; seeds narrowly ellipsoid, ashy-black.—Illustrated, Pflanzenr. IV. 46: 426.

Peru: (*Maclean*). Ecuador; Panama.

Dimerocostus Williamsi Macbr. Field Mus. Bot. 11: 50. 1931.

Similar to *D. Tessmanni*, but the leaves only 1 dm. long and 3–4 cm. wide, the bracts shortly but evidently cleft, the sepals 2 instead of 3 cm. long, and the brown seeds 4 instead of 5 mm. long.—*D. Guttierezii* Kuntze, little known, if sought here can be distinguished by its glabrous sheaths, broad (5–7 mm.) petioles, and black seeds. *D. bolivianus* (Rusby) Loes. has ciliate instead of glabrous bracteoles.

Loreto: Yurimaguas, *Williams 4291*.

4. MONOCOSTUS Schum.

Flowers solitary in the axils of the upper leaves. Ovary 2-celled. —Illustrated, Pflanzenr. IV. 46: 428.

Monocostus Ulei Schum. op. cit. 429. 1904.

A low plant with glabrous leaves 4–8 cm. long and 3–3.5 cm. broad; bracteoles 2 cm. long, the lip 5–6 cm. long.—In dry woods.

San Martín: Near Tarapoto, *Ule 6333*.

36. CANNACEAE. Canna Family

Reference: Kränzlin, Pflanzenr. IV. 47. 1912.

The canna, besides its use as an ornamental plant, is important in South America (to some extent in Peru) as a source of a meal prepared from the roots. The species cultivated for this purpose (especially *C. edulis* Ker) are known as "achira."

CANNA L. Canna

The only genus.—There are many cultivated forms or races. Herbarium material poorly preserved and without color notes, as in most of the recent collections that have come to notice, is not practically determinable.

Staminodia none; flowers paniculate.....*C. paniculata.*
Staminodia 2 or 3; flowers usually racemose.
Plants more or less lanuginose.
Staminodia 2; racemes elongate; sepals greenish red.
C. lanuginosa.
Staminodia 3; racemes often shorter than the leaves.
Flowers 6–7 cm. long; staminodia connate at base.
C. Lambertii.
Flowers to 12 cm. long; staminodia tubular-connate.
C. iridiflora.
Plants glabrous.
Leaves paler beneath; staminodia 2.....*C. concinna.*
Leaves green, sometimes glaucous; staminodia 3, the third sometimes greatly reduced.
Leaves evidently white-margined, 1–1.5 dm. broad.*C. glauca.*
Leaves entirely green, usually 2–2.5 dm. broad.
Flowers red, suffused with orange or yellow....*C. indica.*
Flowers scarlet or yellow.
Leaves elliptic; staminodia very dissimilar..*C. formosa.*
Leaves ovate-oblong; staminodia similar.....*C. edulis.*

Canna concinna Bouché, Linnaea 18: 491. 1844; 39.

About 1 meter high, slender in all parts; leaves 3–4 dm. long, 1 dm. broad; inflorescence well exceeding the leaves, subpaniculate; sepals and petals green, the latter to 3.5 cm. long; staminodia longer, strongly unequal.—*C. coccinea* (see *C. formosa*), with the third staminodium reduced, might be sought here.

Huánuco: Muña, *4066.*—Junín: Chanchamayo Valley, *Schunke 286.*—Without locality (*Mathews 885*). Brazil; Chile.

Canna edulis Ker, Bot. Reg. 9: *pl. 775.* 1823; 64.

Leaves to 6 dm. long and 2 dm. wide, often purplish beneath; pedicels with 2-colored bracts; sepals 12 mm. long; petals 4 cm. long, 7–8 mm. wide; staminodia to 6 cm. long, more than 12 mm. broad.

—Nearly *C. indica*, except for the longer and reddish flowers and the bracted pedicels. Cultivated for its edible tubers.

Peru: (*Mathews 445*). Widely distributed in tropical America.

Canna formosa Bouché, Linnaea 18: 491. 1844; 61.

Similar to *C. indica*, but the staminodia very unequal and dissimilar, the two larger unequal ones spatulate and obtuse or rounded, the third much narrower and acute.—*C. coccinea* Mill. is nearly the same, but the third staminodium is greatly reduced. The var. *bicolor* Kränzl., with yellow flowers, probably occurs in Peru. Illustrated, Berlin Allg. Gartenzeit. 1858: *pl. 11*.

Loreto: Yurimaquenrib, Mainas (*Martius*). Brazil.

Canna glauca L. Sp. Pl. 1. 1753; 54.

Leaves green but glaucescent and white-margined, to 5 dm. long; flowers 8 cm. long, the petals joined in a tube, yellow or suffused with red.—Illustrated, Mart. Fl. Bras. 3, pt. 3: *pl. 16*.

Lima: (*Wawra 2580*). South America and the West Indies.

Canna indica L. Sp. Pl. 1. 1753; 59.

Tall, with green oblong leaves as much as 5 dm. long and 2.5 dm. broad; staminodia subequal and suberect, 4–5 cm. long.—In Peru only in cultivation.

Peru: Cultivated (*Ruiz & Pavón*). Central America; West Indies.

Canna iridiflora R. & P. Fl. 1: 1. 1798; 68.

Sometimes several meters high; leaves to 6 dm. long and 2 dm. wide; racemes little if all exceeding the leaves, nodding; flowers a beautiful rose color.—Illustrated, Bot. Mag. 45: *pl. 1968*.

Huánuco: Pillao (*Ruiz*).—Ayacucho: Prov. Huanta, 2,700 meters, *Weberbauer 5597*.—Cuzco: Urubamba Valley, *Herrera 1566*. "Monte achira," "sumac achira" (the beautiful achira).

Canna Lambertii Lindl. Bot. Reg. 6: *pl. 470*. 1820; 68.

A stout plant with elliptic leaves to 5 dm. long and 12 cm. wide; racemes short, few-flowered, about as long as the upper leaves; sepals and petals lilac or purple, the unequal staminodia bright purple, the larger nearly 1.5 cm. broad.—Illustrated, Pflanzenr. IV. 47: 69.

Peru: (*Mathews 445*). Brazil to Colombia and the West Indies.

Canna lanuginosa Rosc. Monandr. Pl. *pl. 16.* 1828; 35.

Well marked by its long and long-bracted racemes of orange flowers.—Illustrated, Pflanzenr. IV. 47: 36.

Lima: (*Wawra 2536*). Brazil.

Canna paniculata R. & P. Fl. 1: 1. *pl. 1.* 1798; 28.

A tall, more or less lanuginous plant with petioled leaves to 6 dm. long and 1.5–2 dm. wide; scapes slender; flowers in a squarrose panicle; sepals 2 cm. long, green; petals greenish yellow, 5–7.5 cm. long.—The roots are edible but insipid (R. & P.).

Huánuco: Pampayacu, *5067*. Chinchao (*Ruiz*). Chile; Brazil. "Achira cimarrona."

37. MARANTACEAE. Arrowroot Family

Reference: Schumann, Pflanzenr. IV. 48. 1902.

The chief plant of this family is arrowroot, *Maranta arundinacea* L. Meal made from its tuber-like rhizomes is used as food in many parts of the world. Historically interesting is its reputation as an excellent agent to overcome the effects of poisoned arrows. Spruce records its native name as "araruta," from which, someone has suggested, the English name may be derived. The genera as restricted by Schumann apparently conform only in part to the natural relationships, and from a practical standpoint several were better treated as sections of one or two. The following partially artificial key perhaps accounts for the Peruvian species.

Flowers in simple dense spikes, racemes, or panicles, closely bracted (except sometimes in *Calathea foliosa*) and spreading, but the inflorescence subcapitate.

Inflorescence consisting of 1 or more very slender, tubular, spike-like racemes.....2. *Ischnosiphon.*

Inflorescence of 1–many more or less egg-shaped spikes, racemes, or panicles.

Corolla tube longer than or not much shorter than the sepals.

Flowers in a simple spike or head; ovary 3-celled.1. *Calathea.*

Flowers in a congested ovoid panicle; ovary 1-celled.
3. *Monotagma.*

Corolla tube much shorter than the sepals.....4. *Myrosma.*

Flowers or the inflorescence paniculate or, if racemose and bracteate, not very densely so, or the bracts not strongly imbricate or foliose.

Corolla tube longer or not much shorter than the sepals; bracts persistent.

Bracts few (1–5).

Inflorescence very open; bracts distichous.....6. *Maranta.*

Inflorescence simple or compound but rather dense; bracts dorsiventral.....5. *Saranthe.*

Bracts about 8.....3. *Monotagma.*

Corolla tube very short; bracts deciduous.....7. *Thalia.*

1. CALATHEA G. F. W. Mey.

Perennial herbs with commonly simple flower stalks, leafy at base, or leafy, the leaves often long-petioled and colored. Spikes sessile or stalked and accompanied by a solitary leaf or sometimes one to several, and borne as though from a leaf axil. Ovary 3-celled.

Bracts few to 5 and the spikes rarely 1.5 cm. long, or outermost bracts curved-tubular.

Outer bract tube-like, including the inner.....*C. Pavonii.*

Bracts imbricate, not curved.

Leaves oblongish, 1-sided, rarely 5.5 cm. wide; bracts often 5.

Leaves mostly 3.5–4.5 cm. wide.

Leaves drying pale green, acuminate.....*C. micans.*

Leaves drying purplish or mottled, obtusish...*C. undulata.*

Leaves about 2 cm. wide, acuminate.....*C. Klugii.*

Leaves elliptic, to 6 cm. wide; bracts 3, subdistichous. *C. microcephala.*

Bracts many, or at least the spikes 2 to many cm. long.

A. Terminal bracts dissimilar, the sterile forming a coma, or all the bracts soft-appendaged and widely spreading.

B. Bracteoles thin or hyaline; spikes mostly 5 cm. long or wide or even larger.

C. Bracts, at least the lower, obviously imbricate.

Inflorescence villous, much exceeded by the roundish white-striped leaves.....*C. velutina.*

Inflorescence glabrous or somewhat hairy but then, especially, long-peduncled or the leaves not as above.

Peduncles and lower bracts conspicuously villous-lanuginose.....*C. lanata.*

Peduncles, at least, not conspicuously hairy.

Terminal bracts erect, little exserted.....*C. allouia.*

Terminal bracts conspicuous, erect or spreading.

Spikes subglobose or globose-turbinate; leaves green or uniformly colored beneath.

Leaves oblong-elliptic.

Leaves green; sterile bracts erect, reddish. *C. comosa.*

Leaves dark red, pale green, or rose beneath; sterile bracts spreading, green.

Leaves pale or rosy beneath; sterile bracts pale, about 10, the uppermost rhombic. *C. ucayalina.*

Leaves red beneath; sterile bracts green, about 16, the upper oblong-ovate. *C. Sophiae.*

Leaves rotund-elliptic.....*C. jocosa.*

Spikes cylindrical-turbinate; sterile bracts few; leaves purple-splotched beneath.*C. Veitchiana.*

C. Bracts not clearly imbricate, all soft or the lower soft above and as long as or longer than the upper.

Leaves ample, long-villous or puberulent beneath.

Leaves villous.....*C. silvosa.*

Leaves puberulent.....*C. jocosa.*

Leaves small, glabrous.....*C. enclitica.*

B. Bracteoles indurate-clavate (often exserted); spike usually smaller or at least narrower.

Leaves very acuminate, longer than broad.

Leaves about 5 cm. wide; bracts puberulent or partly villous.....*C. Loeseneri.*

Leaves about 1.5–2 dm. wide; bracts densely villous and ciliate.....*C. ulotricha.*

Leaves broadly rounded at apex, sometimes shortly acute, often subrotund.

Bracts very broadly ovate, densely rusty-pilose.

Leaves broadly elliptic or broader; sterile bracts usually several.

Sterile bracts acute; leaves elliptic, 20–30 cm. long. *C. peruviana.*

Sterile bracts obtuse; leaves suborbicular, 5 cm. long. *C. virginalis.*

Leaves unequally oblong; sterile bracts 2. . *C. Legrelleana.*

Bracts suborbicular, sparsely pubescent with minute or lax hairs. . . . . *C. roseopicta.*

A. All the bracts alike or at least all floriferous.

D. Inflorescence lateral, i. e. peduncled from a bract or leaf, or the peduncle sheathed.

Bracts obviously distichous.

Spikes elongate-cylindrical, narrow.

Leaves pruinose beneath. . . . . *C. lutea.*

Leaves green beneath. . . . . *C. Casupito.*

Spikes flat, 6–7 cm. wide. . . . . *C. insignis.*

Bracts evidently spiraled; spikes (1–3) ellipsoid to broadly cylindrical.

Peduncle accompanied by a leaf. . . . . *C. allouia.*

Peduncle bract-sheathed, the sheath sometimes produced as a bract.

Spikes globose, 2–3 cm. long; bracts purple. . *C. dicephala.*

Spikes ovoid or cylindrical, several to many cm. long.

Petioles and peduncle bract glabrous. *C. pachystachya.*

Petioles and peduncle pubescent.

Leaves violet beneath; bracts 1.5 cm. long. *C. contamanensis.*

Leaves metallic blue-green; bracts 3–4 cm. long. *C. Standleyi.*

D. Inflorescence solitary, terminal or basal, not (or not obviously) from a more or less remote bract or leaf.

Peduncle elongate, sometimes 1 meter high.

Bracts many, yellowish or purple.

Bracts acuminate or lacerate.

Spikes yellowish, globose, to 8 cm. thick. . *C. altissima.*

Spikes dark purple, cylindrical, about 1 dm. long. *C. contamanensis.*

Bracts rounded or obtuse and apiculate.

Bracteoles present; leaves glabrous.....*C. gigas.*

Bracteoles lacking; leaves puberulent beneath. *C. aberrans.*

Bracts about 7, reddish.....*C. lateralis.*

Peduncle lacking or short (to about 7 cm. high).

Spikes ovoid-turbinate or ellipsoid, 2–3 cm. wide.

Bracts somewhat brownish purple; petioles short-vaginate.....*C. exscapa.*

Bracts pale green or yellowish; petioles long-vaginate.

Spikes about 6 cm. long.

Peduncle about 4 cm. long; ovary glabrous. *C. pacifica.*

Peduncle obsolete; ovary pubescent..*C. laetevirens.*

Spikes ovoid, about 3 cm. long.

Peduncle about 4 cm. long or longer; leaves very thin.....*C. chrysoleuca.*

Peduncle nearly lacking; leaves firm...*C. mishuyacu.*

Spikes narrowly cylindric, about 1 cm. wide..*C. Williamsi.*

Calathea aberrans Huber, Bol. Mus. Goeldi 4: 549. 1906.

One to 5 meters high, the oblong-ovate leaves green and light green above, uniformly pale green and puberulent beneath; scapes 3 dm. long; spikes ovoid, 12 cm. long; bracts numerous but bracteoles lacking; corolla tube pilose, a little longer than the calyx; flowers white, 5 cm. long, the sepals yellowish, 2.5 cm. long; outer staminodia in the lower flowers often 2 (*Nudiscapae*).

Loreto: Region of the Pampa del Sacramento (*Huber*).

Calathea allouia (Aubl.) Lindl. Bot. Reg. 14: sub *pl. 1210.* 1828; 85. *Maranta allouia* Aubl. Pl. Guian 1: 3. 1775.

Plants 1–2 meters high; leaves large, glabrous or nearly so but the long petioles and especially the sheaths pubescent; spikes ellipsoid, subsessile or on peduncles to 1 dm. long; bracts soft, pale, lightly pilose; corolla white, 3–4 cm. long, the pubescent tube 2–2.5 cm. long.

Loreto: Yarina-cocha, *Tessmann 5491* (vel. aff., det. Loesener). West Indies. "Daledale."

Calathea altissima (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 141. 1862; 94. *Phrynium altissimum* Poepp. & Endl. Nov. Gen. & Sp. 2: 20. 1838.

Leaves glabrous, purple beneath, to 5.5 dm. long and nearly 2 dm. wide, long-petioled; spikes globose, to 8 cm. long, the oblong-ovate acuminate bracts appressed-puberulent; sepals under 2 cm. long, pubescent, especially at apex; corolla yellow, the tube pubescent, 3 cm. long, the lobes to 13 mm. long.

Loreto: Yurimaguas, *Williams 7833, 4111; Poeppig.* Caballococha, *Williams 2331.* Río Acre, *Ule 9259* (det. Loesener).—Huánuco: *Weberbauer 3580.*—San Martín: Tarapoto, *Williams.* Brazil; Panama; Surinam.

Calathea Casupito (Jacq.) G. F. W. Mey. Prim. Fl. Esseq. 10. 1818; 72. *Maranta Casupito* Jacq. Fragm. 51. *pl. 64.* 1809.

Similar to *C. lutea,* but the bracts many, usually about 18, and the leaves green beneath.

Huánuco: Monzón, *Weberbauer 3603* (det. Loesener). Venezuela.

Calathea chrysoleuca (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 142. 1862; 96. *Phrynium chrysoleucum* Poepp. & Endl. Nov. Gen. & Sp. 2: 19. 1838.

Glabrous except for the noticeably villous sepals and strigose-sericeous corollas; leaves to 3 dm. long and half as wide; spikes egg-shaped, on peduncles to 7 cm. long; outer bracts ovate, acute, to 3.5 cm. long, the inner oblong, white; corolla tube 3.5 cm. long, the lobes to 12 mm. long.—About 5 dm. tall. *C. Mansoi* Koern. is very similar, but the bracts are villous within.

Huánuco: Pampayacu (*Poeppig 2332*).—San Martín: Tocache (*Poeppig*).

Calathea comosa (L. f.) Lindl. Bot. Reg. 14: sub *pl. 1210.* 1828; 89. *Maranta comosa* L. f. Suppl. 80. 1781. *M. capitata* R. & P. Fl. 1: 3. *pl. 5.* 1798. *Phrynium Achira* Poepp. & Endl. Nov. Gen. & Sp. 2: 21. 1838.

A stout plant to 3 meters high, with very long-petioled, one-sided, oblong leaves to 3 dm. long and 1 dm. wide, appressed-puberulent on the nerves beneath or glabrous; spikes globose, to 1 dm. thick, the petiole of the companion leaf to 4 dm. long; bracts to 5 cm. long, ovate-lanceolate, the inner puberulent and greenish yellow with red tips; sepals lanceolate, acuminate, white, 1.7 mm. long;

corolla yellow, the outer staminodium 18 mm. long.—Variable, as interpreted.

Huánuco: Posuso, Cochero, and Chicoplaya, *Ruiz & Pavón; (Poeppig 1228)*.—Loreto: Cumaría, *Tessmann 3347, 3357*. Mouth of Río Santiago, *Tessmann 4571*. Río Acre, *Ule 9258*.—San Martín: Tarapoto, *Williams 6059*. Colombia; Surinam. "Achira de monte."

Calathea contamanensis Huber, Bol. Mus. Goeldi 4: 547. 1906.

Similar to *C. altissima*, but the leaves marked with red or white above, the spike stalk only 3–6 dm. long, the spikes about 5 cm. thick, and the bracts dark violet.—*Nudiscapae* according to the author, but from description better referred to the *Scapifoliae*.

Loreto: Cerros de Contamana and Canchahuayo, and less frequently on the Pampa del Sacramento (*Huber*). "Bijanillo."

Calathea dicephala (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 127. 1862; 86. *Phrynium dicephalum* Poepp. & Endl. Nov. Gen. & Sp. 2: 20. *pl. 128*. 1838.

Several dm. high, with slender-petioled, one-sided, broadly ovate, subcordate leaves, white-pruinose beneath, up to 2 dm. long and 11.5 cm. broad; spikes solitary or geminate, subglobose; bracts glabrous, ovate or suborbicular; sepals 9 mm. long, equaling the tube of the white corolla, its lobes to 4 mm. long; outer staminodium pale rose.

Huánuco: Pampayacu (*Poeppig 1547*).

Calathea enclitica Macbr. Field Mus. Bot. 11: 53. 1931.

Glabrous, slender, pale green, the scarcely at all oblique leaves nearly obtuse at base and apex, about 1.5 dm. long and 6–7 cm. wide; peduncles at least 1 dm. long; spikes turbinate-globose, the outer bracts to 4 cm. long, the inner to 3 cm. and widely spreading, all soft and greenish white; bracteoles thin; sepals 12 mm. long; outer staminodium 17 mm. long; ovary glabrous.

Loreto: Pebas, *Williams 1955*, type.

Calathea exscapa (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 122. 1862; 96. *Phrynium exscapum* Poepp. & Endl. Nov. Gen. & Sp. 2: 18. *pl. 125*. 1838.

A low plant, lightly pubescent on the long (about 1.5 dm.) petioles, the middle area of the oblong-lanceolate leaves above, and the inner bracts; leaves paler beneath, variegated above, acuminate,

5–7 cm. wide and 1–1.5 dm. long; spike about 2 cm. broad, the peduncle 1–5 cm. long; bracts ovate, acuminate, somewhat purplish; sepals 2 cm. long, glabrous; corolla white suffused with rose, callose, twice exceeding the sepals.—*C. Sellowi* Koern., if sought here, is definitely distinguishable only by its glabrous ovary. Neg. 9816.

Loreto: Yurimaguas, *Poeppig 2332a; Williams 7868.*

Calathea gigas Gagnep. Bull. Soc. Bot. France 50: 589. 1904.

Very large, the great leaves purplish beneath, several dm. long and about 3 dm. broad, glabrous; peduncles greatly elongate, puberulent; spikes 8–10 cm. long, 5–6 cm. wide, pale or roseate; flowers 3 cm. long.

Loreto: San Isidro, *Tessmann 4994* (vel. aff., det. Loesener). Bolivia.

Calathea insignis Peters. in Mart. Fl. Bras. 3, pt. 3: 124. 1890; 73.

Tall, with ample foliage, the leaves somewhat oblique at tip; spikes 6–7 cm. wide and often 2.5–3 dm. long, the broad and evenly distichous, straw-colored bracts scarious on the margins.—Immediately recognizable by the nodding inflorescence.

Ayacucho: Kimpitiriki, *Killip & Smith 22885.*—Loreto: San Antonio, *Killip & Smith 29315* (det. Gleason). Ecuador.

Calathea jocosa Macbr. Field Mus. Bot. 11: 53. 1931.

Known only from a leaf and one spike, but apparently related to *C. silvosa*, from which the ample (23 cm. long, 15 cm. wide) roundish leaves, puberulent beneath, and the large globose glabrous spikes readily distinguish it; bracts widely divaricate, thin, the outer nearly 5 cm. long, the numerous sterile little shorter; bracteoles thin; ovary glabrous; flowers unknown.

Loreto: Recreo near Yurimaguas, *Williams 3986*, type.

Calathea Klugii Macbr. Field Mus. Bot. 11: 55. 1931.

A glabrous, distinctly rhizomatous herb 1–2 dm. high, with slender petioles, peduncles, and leaves, the last conspicuously acuminate, little oblique, mostly about 12 cm. long, green or purple beneath; bracts oblong-ovate, subacute, the outer 7 mm. long, all glabrous or minutely and sparsely pubescent; flowers white and violet, the tube 1 cm. long, the subequal lobes and staminodium 4 cm. long.

Loreto: Mishuyacu, near Iquitos, *Klug 532*, type.

Calathea laetevirens Huber, Bol. Mus. Goeldi 4: 548. 1906.

Leaves pale green, or sometimes silvery above through the middle and pale rose beneath; spike scape scarcely 1 dm. high; spikes globose-turbinate, 6 cm. long; bracteoles 2.5 cm. long; sepals 1.5 cm. long, the tube of the yellow corolla twice as long.—*Nudiscapae.*

Loreto: Cerros de Contamana and Canchahuayo and also on the Pampa del Sacramento (*Huber*).

Calathea lanata Peters. in Mart. Fl. Bras. 3, pt. 3: 119. *pl. 31.* 1890; 89.

Resembling *C. comosa,* but the long petioles and scapes and especially the lowest bracts very densely lanuginose with long soft brownish hairs; spike about 1 dm. long, crowned with erect sterile bracts; flowers over 3 cm. long, the tube nearly 2 cm. long.—Killip and Smith noted the bracts and perianth as white, the lip blue-tinted.

Junín: Puerto Yessup, 400 meters, *Killip & Smith 26262.* Brazil.

Calathea lateralis (R. & P.) Lindl. Bot. Reg. 14: sub *pl. 1210.* 1828; 75. *Maranta lateralis* R. & P. Fl. 1: 4. 1798. *Phrynium laterale* Poepp. & Endl. Nov. Gen. & Sp. 2: 21. 1838.

Cespitose, about 1 meter high, glabrous except for the villous bract tips; leaves long-petioled, oblong, thick, white-pruinose beneath, to 4.5 dm. long and 2.5 dm. wide; spikes sessile, 8 cm. long and thick; bracts reddish; tube of the yellow corolla 3.5 cm. long, more than thrice the length of the lance-acuminate sepals.

Huánuco: Cochero (*Ruiz & Pavón; Poeppig 1307*). Colombia.

Calathea Legrelliana Regel, Gartenfl. 28: 301. 1879; 78.

A low plant, the inequilateral oblong-rotund leaves exceeding the narrow spikes; leaves minutely puberulent beneath, to 3 dm. long and more than half as wide; peduncles 5–20 cm. long; spikes 5–10 cm. long; flowers 2 cm. long, the corolla tube 12 mm. long. Neg. 9821.

Loreto: Río Acre, *Ule 9254.* Colombia; Ecuador.

Calathea Loeseneri Macbr. Field Mus. Bot. 11: 51. 1931.

A trim and graceful plant, its long slender peduncles bearing a narrowly turbinate inflorescence conspicuously adorned by several oblongish terminal bracts; leaves very oblique at base, nearly 1.5 dm. long, glabrous above but puberulent beneath, especially on the nerves, as also the petioles, the latter (to 13 cm. long) vaginate to the middle; peduncles to 3 dm. long, below the spike (about 7 cm.

by 2–2.5 cm.) with the lowest bracts (2–2.5 cm. long) somewhat long-villous or merely puberulent; capsule glabrous; flowers unknown, except as "lilac."

Loreto: In marsh, Mishuyacu, near Iquitos, *Klug 940*, type.

Calathea lutea (Aubl.) G. F. W. Mey. Primit. Fl. Esseq. 10. 1818; 72. *Maranta lutea* Aubl. Pl. Guian. 1: 4. 1775. *M. Casupo* Jacq. Fragm. 51. *pl. 63*. 1809.

A gigantic plant, sometimes attaining a height of 5 meters, with thick, elliptic or suborbicular leaves pruinose beneath, the basal ones as much as 1.5 meters long by 6 dm. broad; spikes erect; bracts reddish or brownish, coriaceous, rarely as many as 12; corolla yellowish, the tube about three times longer than the sepals, these 1 cm. long; staminodium 2 cm. long.—Illustrated, Linnaea 22: *pl. 3* (flowers).

Loreto: Yurimaguas (*Poeppig*); *Killip & Smith 27512*. Río Acre, *Ule 9251*.—Junín: La Merced, *Weberbauer 1825*. Central America; West Indies.

Calathea micans (Mathieu) Koern. Gartenfl. 7: 87. 1858; 112. *Maranta micans* Mathieu, Cat. Pl. 1853, according to Peters. in Mart. Fl. Bras. 3, pt. 3: 96. 1890.

Usually less than 2 dm. high; leaves oblong-lanceolate, rounded at base, about 1 dm. long and 3.5 cm. wide; spikes ellipsoid, to 1 cm. long; bracts ovate-oblong, acuminate, glabrous; sepals lanceolate, 8 mm. long, equaling the tube of the white corolla; outer staminodium bilobed, 5 mm. long, pale violet.—Our material is hairy or glabrous. 101. Illustrated, Mart. Fl. Bras. 3, pt. 3: *pl. 20*.

Loreto: Prov. Mainas (*Poeppig*). Mouth of Río Santiago, *Tessmann 4270* (vel aff., det. Loesener).—Without locality (*Warscewicz*). Brazil.

Calathea microcephala (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 125. 1862; 111. *Phrynium microcephalum* Poepp. & Endl. Nov. Gen. & Sp. 2: 20. *pl. 128*. 1838.

A small herb, similar to *C. micans*, but with the corolla tube slightly exserted and the flowers entirely white.—An obscure species, not recollected unless by Huber. Perhaps the type was abnormal or poorly developed.

Loreto: Yurimaguas (*Poeppig*). Cerros de Contamana and Canchahuayo, and on the Pampa de Sacramento (*Huber*).

Calathea mishuyacu Macbr. Field Mus. Bot. 11: 54. 1931.

Similar to *C. exscapa*, but the leaves larger, to 1 dm. wide, the bracts coriaceous, and the yellowish flowers apparently much smaller, the sepals only 12 mm. long.

Loreto: Mishuyacu, near Iquitos, *Klug 416*, type.

Calathea pachystachya (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 142. 1862; 87. *Phrynium pachystachyum* Poepp. & Endl. Nov. Gen. & Sp. 2: 19. *pl. 127*. 1838.

Allied to *C. dicephala*, but tall and the leaves lanceolate-oblong, to 3.5 dm. by 13 cm.; spikes to 18 cm. long; outer bracts 3 cm. long; sepals 2.5 cm. long, equaling the white corolla tube, the corolla lobes yellow, the staminodium violet.—*C. Sodiroi* Eggers, of Ecuador, has entirely yellow flowers, the corolla tube hirsute.

Huánuco: Paquio, below Pampayacu (*Poeppig*).

Calathea pacifica Linden & André, Ill. Hort. 19: *pl. 101*. 1872; 105.

About 3 dm. high; leaves oblong, medianly puberulent above, purplish beneath, to 17 cm. long and 9 cm. wide, the petioles very long-vaginate; spikes ellipsoid, to 6 cm. long and 3 cm. thick, the peduncle 4 cm. long; bracts glabrous, very broadly ovate; sepals 1 cm. long, a little shorter than the corolla tube and the outer staminodium.—*C. Sellowi* Koern. has subsessile subglobose spikes. Introduced by Linden in 1870. Illustrated, Mart. Fl. Bras. 3, pt. 3: *pl. 32* (flower).

San Martin: Moyobamba (*Wallis*).

Calathea Pavonii Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 116. 1862; 80. *C. tubispatha* Hook. Bot. Mag. 91: *pl. 5542*. 1865.

A slender plant of medium height with more or less variegated, green leaves, minutely puberulent beneath; outer bract suborbicular and tube-like, more or less including the others; sepals 12 mm. long; tube of the yellow corolla 16 mm. long; outer staminodium 13 mm. long.—Illustrated, Pflanzenr. IV. 46: 79.

Huánuco: Chicoplaya (*Pavón*).—Without locality (*Pearce*).—Loreto: Yarina-cocha, *Tessmann 3391* (det. Loesener). Río Acre, *Ule 9253* (det. Loesener).

Calathea peruviana Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 128. 1862; 91.

Similar to *C. roseopicta* but taller and the foliage green; leaves to 3 dm. long and 2 dm. wide, puberulent at least medially beneath; bracts to 2.5 cm. long, yellow-villous; sepals 7 mm. long, the corolla tube twice as long, the staminodium 11 mm. long.—Flowers tinted pinkish blue. Neg. 9827.

Huánuco: Chicoplaya (*Pavón*).—Junín: La Merced, 1,000 meters, *Weberbauer 1817* (det. Loesener). North of La Merced, *Killip & Smith 23669*.

Calathea roseopicta (Linden) Regel, Gartenfl. 18: 97. *pl. 610*. 1869; 91. *Maranta roseopicta* Linden, Belg. Hort. 16: 202. 1866.

Leaves beautifully suffused with red near the margins above and purplish beneath, very one-sided, about 2 dm. long and 1.5 dm. wide; spikes subcylindrical, 9 cm. long; bracts suborbicular, 3 cm. long, pubescent with long hairs (in our material glabrate), the sterile narrower, glabrous, colored; sepals 15 mm. long, nearly equaling the corolla tube, the staminodium a little shorter.—About 2 dm. tall. Flowers white and violet (Klug). The name was originally hyphenated.

Loreto: Between Loreto and Iquitos (*Wallis*). Mishuyacu, near Iquitos, *Klug 506, 1035*.

Calathea silvosa Macbr. Field Mus. Bot. 11: 52. 1931.

Leaves beneath, peduncles, and bracts lightly but conspicuously villous with long, brown, mostly wide-spreading hairs; petioles vaginate at base, to 6 dm. long; leaves thin, green, nearly equilateral, very shortly acuminate, about 3 dm. long and half as wide; spike 6 cm. thick; bracts thin, strongly depressed-spreading, 5 cm. long, 12 mm. wide, the inner sterile ones half as large; sepals glabrous, 17 mm. long; corolla green and brown, the tube 2.8 cm. long, the lobes and staminodium subequal, about a third as long; ovary glabrous.

Loreto: In woods near Iquitos, *Klug 11*, type.

Calathea Sophiae Huber, Bol. Mus. Goeldi 4: 550. 1906.

Closely related to *C. Veitchiana*(?) but the leaves dark green above, the spikes subglobose and depressed at apex, the corolla tube nearly 3 cm. long, the sepals nearly 2 cm. long.—The outer staminodium toward the apex is rose-violet. *C. Leonia* Hard., possibly represented by a sterile plant from Iquitos (*Killip & Smith 27118*), has smaller flowers and leaves white-variegated above.

Loreto: Pampa del Sacramento (*Huber*).

Calathea Standleyi Macbr. Field Mus. Bot. 11: 54. 1931.

A stately plant, suffused throughout with a blue-metallic tint; petioles (below the 2 cm. long callus) and peduncles conspicuously appressed-villous, otherwise glabrous; petioles to 10 dm. long, the leaves to nearly half as long, about 2 dm. wide; peduncle 1 dm. long, above the middle bearing an oblong-lanceolate bract 1 dm. long; spike nearly 1 dm. long, fully half as thick; bracts broadly ovate or subrotund, scarcely acute, to 3.5 cm. wide; bracteoles thin; flowers pale yellow, 4 cm. long, the calyx half as long, the corolla tube 3 cm. long, the staminodia subequal, 8 mm. long.

Junín: Puerto Yessup, *Killip & Smith 26263*, type.

Calathea ucayalina Huber, Bol. Mus. Goeldi 4: 551. 1906.

Apparently very similar to *C. comosa*, but the bracts white or pale green, the sterile broad.—Described from cultivated specimens.

Loreto: Cerro de Canchahuayo and Pampa del Sacramento (*Huber*).

Calathea ulotricha Macbr. Field Mus. Bot. 11: 52. 1931.

Unknown except for the broadly elliptic, oblique leaf, 4 dm. long, green but beneath minutely puberulent, and the pale yellowish and densely soft-pubescent spike about 8 dm. long and 3 cm. broad or, with the flowers, 5 cm. broad; bracts subtruncate, 2 cm. long and 1 cm. broad, except the subacute sterile terminal one 5 mm. wide; sepals 1 cm. long; flowers 2.5 cm. long, the glabrous exserted tube 18 mm. long, the outer staminodium 9 mm. long.

Loreto: Santa Rosa, *Williams 4921*, type.

Calathea undulata Linden & André, Ill. Hort. 19: 160. *pl. 98.* 1872; 113.

Allied to *C. micans*, but leaves with a median light-colored zone and violet beneath; spikes turbinate, under 2 cm. long; bracts white-margined and densely white-punctate; staminodium white.—The similar *C. Baraquinii* (Lem.) Regel, of adjacent Brazil, has green and white-lined leaves to 1.5 dm. long.

Loreto: On the Huallaga (*Wallis*); *Williams 5301*.—Junín: Chanchamayo, *Raimondi* (det. Loes.).—San Martín: Tarapoto and San Roque, *Williams 6787, 5301, 7393*.

Calathea Veitchiana Hook. f. Bot. Mag. 91: *pl. 5535.* 1865; 90.

A beautiful plant about 1 meter high, its ample lustrous green leaves with lighter lunate markings above and with purple splotches

beneath; spikes turbinate, to 8 cm. long; bracts to 3 cm. long, appressed-pilose; sepals 10 mm. long; tube of the white corolla 13 mm. long; staminodium 1 cm. long, violet-spotted.—Often cultivated.

Peru: (*Pearce*).

Calathea velutina (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 127. 1862; 89. *Phrynium velutinum* Poepp. & Endl. Nov. Gen. & Sp. 2: 19. *pl. 126*. 1838.

Scapes much shorter than the broad roundish-elliptic leaves, about 2.5 dm. long and 1.5 dm. wide; spikes turbinate, to 5 cm. long; flowers white, the staminodium 8 mm. long.—Illustrated, Horaninow, Monogr. Scitam. *pl. 3*.

Loreto: Yurimaguas, *Poeppig 2142*.

Calathea virginalis Linden, Gartenfl. 28: 299. 1879; 90.

Low, 2–3 dm. high, with one-sided suborbicular leaves (to about 1 dm. long) that are finely and softly pubescent beneath; spikes 3–5 cm. long and 2.5–3 cm. wide, the broadly ovate fertile bracts rusty-pilose; ovary glabrous; corolla 2.5 cm. long, the tube 13 mm. long.

Loreto: Yurimaguas, *Williams 4254*. Brazil.

Calathea Williamsi Macbr. Field Mus. Bot. 11: 55. 1931.

In aspect rather similar to *C. Legrelleana*, but the leaves softly pubescent above, about 1.5 dm. long and nearly half as wide; the nodding spike obviously without sterile terminal bracts.

Loreto: La Victoria, *Williams 2541*, type.

DOUBTFUL SPECIES

Calathea Wallisi (Linden) Regel, Ind. Sem. Hort. Petrop. 14. 1869; 116. *Maranta Wallisi* Linden, Belg. Hort. 17: 105. 1867.

From the meager description of only the foliage, it seems probable that this is an earlier name for *C. undulata* Linden & André. It was sent in also by Wallis from an unknown locality in Peru.

2. ISCHNOSIPHON Koern.

Tall branching plants, tree-like or bamboo-like, or the stems simple and naked, with a tuft of leaves at the summit, or less frequently leafy at base, but always with the slender-tubed flowers arranged in very narrow, cylindrical, spike-like racemes, solitary or many. Bracts persistent or tardily deciduous. Flowers geminate. Staminodia solitary. Ovary 1-celled.

Huge erect plants, their large leaves decidedly one-sided at the tip.
Leaves concolorous or at least not white-pruinose beneath.
Spikes 5–7 mm. thick.
Stems smooth or nearly so; spikes several, fascicled. *I. Arouma.*
Stems strongly verruculose; spikes solitary or geminate. *I. verruculosa.*
Spikes about 10 mm. thick..... *I. obliquus.*
Leaves white-pruinose beneath..... *I. obliquiformis.*
Lianas or herbs, often small and slender, rarely suffrutescent, the leaves, if large, with centered tips.
A. Leaves never suborbicular and in most species not strongly inequilateral at tip.
B. Leaves green or glaucous but never white-pruinose beneath.
C. Leaves ovate-lanceolate to elliptic, 3 to many cm. wide.
Spikes glabrous or nearly so; stems not verruculose nor leaves definitely pubescent.
Leaves large, to 5–6 dm. long..... *I. cerotus.*
Leaves much smaller.
Petioles evidently annulate at sheath tip, 3–6 cm. long. *I. annulatus.*
Petioles not annulate, usually short.
Leaves concolorous, 3–4 cm. wide; bracts 3 cm. long..... *I. gracilis.*
Leaves 4.5–12 cm. wide or, if narrower, very dark beneath; bracts often 3–4 cm. long.
Flowers solitary, at least the upper, glabrous or nearly; leaves typically drying dark brown beneath..... *I. surinamensis.*
Flowers geminate, pubescent, or the leaves 8–12 cm. wide.
Leaves not at all or obscurely oblique at tip, not crowded.
Leaves 4.5–5.5 cm. wide, gradually acuminate..... *I. surumuensis.*
Leaves 8–12 cm. wide, abruptly acuminate. *I. neotericus.*
Leaves strongly oblique at tip, crowded at nodes..... *I. Killipii.*

Spikes puberulent or hairy, or stems verruculose, or leaves pubescent.
Spikes puberulent, at least minutely.
Stems not verruculose.
Leaves puberulent beneath.....*I. puberulus.*
Leaves glabrous.....*I. wyomingensis.*
Stems strongly verruculose.....*I. verruculosus.*
Spikes more or less shaggy-villous.
Leaves subconcolorous, roundish at base.*I. lasiocoleus.*
Leaves paler beneath, cuneate at base.....*I. ornatus.*
Leaves oblong-lanceolate, 2–2.5 cm. wide....*I. bambusaceus.*
B. Leaves definitely white-pruinose beneath.
Tall plants, leafy.....*I. surinamensis.*
Low plants, leafy only from the base.....*I. leucophaeus.*
A. Leaves suborbicular and strongly one-sided at tip. *I. rotundifolius.*

Ischnosiphon annulatus Loes. Notizbl. Bot. Gart. Berlin 6: 273. 1915.

Several meters high, the tips of the branchlets notably annulate; leaves few, cuneate at base, very shortly acuminate, glabrous except the tips, 1.5–3 dm. long, the petioles callous only above, 3.5–7 cm. long; racemes 2, about 17 cm. long, the peduncle 8 cm. long; bracts 4–6.5 cm. long, 4 scarious; sepals 3, linear, acute, 2.3–2.7 cm. long; corolla pink.—Related to *I. Arouma* (Aubl.) Koern. and *I. polyphyllus* (Poepp. & Endl.) Koern., but differing in its annulate branchlets from both, also from the former in its cuneate-based leaves, and from the latter in its tall stature. *I. Uleanus* Loes., also to be expected, resembles most *I. polyphyllus*, but its leaves are subrotund at base and obliquely acuminate. Neg. 9864.

Loreto: Cerro de Ponasa, 1,200 meters, *Ule 6847*. Mouth of Río Santiago, *Tessmann 4532* (vel. aff., det. Loesener).

Ischnosiphon Arouma (Aubl.) Koern. Nouv. Mém. Soc. Nat. Mosc. 11: 348. 1859; 159. *Maranta Arouma* Aubl. Pl. Guian. 1: 3. 1775.

A coarse herb 1–3 meters high with large, commonly ternate, concolorous leaves; petioles elongate, the terete callus to 2.5 cm. long; sheaths somewhat pilose-puberulent; inflorescence commonly compound, the long spikes appearing fascicled; bracts minutely and

sparsely puberulent; sepals narrowly linear, 2.5 cm. long, glabrate; corolla yellow and reddish, 2.5 cm. long or longer.—The name was spelled *"aruma"* by Koernicke. Illustrated, Pflanzenr. IV. 48: 157.

Loreto: Yarina-cocha, *Tessmann 5553* (det. Loesener). Brazil; Guianas; West Indies.

Ischnosiphon bambusaceus (Poepp. & Endl.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 94. 1862; 162. *Calathea bambusacea* Poepp. & Endl. Nov. Gen. & Sp. 2: 23. 1838.

A high-climbing plant, branching and nodose in the manner of some bamboos; leaves glabrous, glaucous beneath, to 12 cm. long and 2 cm. broad or a little broader; racemes to 8 cm. long, sessile, solitary or in pairs at the nodes, the bracts coriaceous, glabrous, pale, to 2.5 cm. broad; sepals setiform; corolla tube to 3 cm. long, the lobes a third as long, pale yellow; staminodia violet.

Loreto: Yurimaguas, *Poeppig 2431*. Pebas, *Williams 1699*.

Ischnosiphon cerotus Loes. Notizbl. Bot. Gart. Berlin 6: 278. 1915.

Leaves little oblique at the broadly cuneate-rotund base, 2.5–4.5 dm. long, 1.5–2 dm. wide, puberulent on the nerves above; racemes 1–2 dm. long, on glabrous peduncles 4–7 cm. long; bracts 5–9, about 3 cm. long; sepals linear-lanceolate, 22 mm. long, equaling the tube of the dull yellow corolla.—Similar to the probably Peruvian *I. hirsutus* Peters., of Brazil, but the latter with leaves to 1 dm. long and more or less villous. Neg. 9866.

Huánuco: On the Monzón, 600 meters, *Weberbauer 3631*.

Ischnosiphon gracilis (Rudge) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 94. 1862; 163. *Maranta gracilis* Rudge, Pl. Guian. 8. *pl. 3*. 1805.

Slender-stemmed, much branched, with short-petioled small oblong-ovate leaves; petioles calloused; spikes solitary, rarely more than 1.5 dm. long; sepals 2 cm. long; flowers 3 cm. long, sometimes pubescent.—Distinctive in habit. The var. *Wallisii* Schum. has petioles to 4 cm. long, callous only on the upper portion, and the leaves are as much as 17 cm. long and 4 cm. wide.

Loreto: La Victoria, *Williams 2930*. Caballo-cocha, *Williams 2221*. Brazil; British Guiana.

Ischnosiphon Killipii Macbr. Field Mus. Bot. 11: 55. 1931.

Scandent and apparently much branched at the enlarged nodes; leaves green, not paler beneath, elliptic, rounded at base, about 12

cm. long and 5 cm. broad, the petioles 7 cm. long, the articulation 3–6 mm. long; spikes 12 cm. long, 6 mm. thick; bracts 3.5 cm. long; sepals puberulent, 2 cm. long; corolla tube glabrous, nearly twice as long; staminodium 12 mm. long; ovary slightly pilose.—With the habit of *I. gracilis*, but with different foliage and spikes.

Loreto: Iquitos, *Killip & Smith 26929*, type.

Ischnosiphon lasiocoleus Schum. ex Loes. Notizbl. Bot. Gart. Berlin 6: 279. 1915. *I. lasiocoleus* var. *bolivioides* Loes. op. cit. 280.

Plants 1.5–2 meters high, branching, more or less, but lightly, villous-hirsute except the glabrous or glabrate leaves; petioles 2–4 cm. long, typically calloused the entire length; leaves broadly oblong-lanceolate, 2–3.5 dm. long, 6–14 cm. wide, concolorous or nearly so but the veins above marked with lighter green; spikes solitary or usually 2–3, slender, to 2 dm. long; bracts 2 cm. long; sepals 1 cm. long, pubescent; flowers white or tinted. Neg. 9868.

Loreto: Balsapuerto, *Killip & Smith 28686*.—Junín: Puerto Bermúdez, 375 meters, *Killip & Smith*. Brazil.

Ischnosiphon leucophaeus (Poepp. & Endl.) Koern. Nouv. Mém. Soc. Nat. Mosc. 11: *pl. 10, 11*. 1859; 160. *Calathea leucophaea* Poepp. & Endl. Nov. Gen. & Sp. 2: 21. *pl. 129*. 1838.

Rather similar to *I. surinamensis*, but a low plant, the leaves all basal; leaves larger, often several dm. long and 1 dm. or more broad, or smaller, and with a broad-based but very slender-tipped, scarcely excentric acumen; spikes usually several, mostly 1–1.5 dm. long; flowers white or tinted, 3.5 cm. long.

Loreto: Pebas, *Williams 1891* (?; stem lacking). Iquitos, *Killip & Smith 27373; Klug 224*. Brazil; Panama.

Ischnosiphon neotericus Macbr. Field Mus. Bot. 11: 57. 1931.

A glabrous plant, notable for its long (to 2.5 dm.) petioles, vaginate only at base, the callus 2 cm. long, and for its large equilateral leaves with an acumen to 2 cm. long; leaves green on both sides; spikes solitary, 12 cm. long, 4 mm. thick; bracts 3 cm. long, the indurate bracteoles slightly longer; sepals linear, minutely puberulent, 18 mm. long; flowers apparently rose-color, glabrous, the tube 3.5 cm. long, the narrow lobes 9 mm. long, the crenulate staminodium 11 mm. long; ovary glabrous.

Loreto: Iquitos, *Williams 3761*, type.

Ischnosiphon obliquiformis Loes. Notizbl. Bot. Gart. Berlin 6: 272. 1915.

Apparently the same as *I. Arouma* except the leaves white-pruinose beneath and the flowers yellow.—In our specimen the collector noted the flowers as "yellow and lilac-rose." As suggested by Loesener, the plant could be treated as a variety of *I. Arouma*. Neg. 9869.

Loreto: Mishuyacu, *Klug 1006*. Brazil.

Ischnosiphon obliquus (Rudge) Koern. Nouv. Mém. Soc. Nat. Mosc. 11: 341. 1859; 163. *Maranta obliqua* Rudge, Pl. Guian. 1: 8. *pl. 2*. 1805.

In general not particularly different from *I. Arouma*, but the spikes much more robust and the flowers a little longer; bracts 3–4.5 cm. long.—*I. grandibracteatus* Loes. has many fasciculate spikes several dm. long, the bracts 5 cm. long or longer. Illustrated, Mart. Fl. Bras. 3, pt. 3: *pl. 35*.

Loreto: Iquitos, *Tessmann 5115* (det. Loesener). Martinique to Colombia and Brazil.

Ischnosiphon ornatus Macbr. Field Mus. Bot. 11: 57. 1931.

Sheaths, peduncles, and bracts rusty-pilose or the latter almost shaggy; petioles to 1.5 dm. long, vaginate below the middle, glabrate or puberulent; leaves equilateral, 1.5–2 dm. long and 6 cm. wide, glabrous except for the midnerve; bracts about 2 cm. long, the bractlets only 17 mm. long; sepals linear, pilose, 15 mm. long; corolla tube puberulent, 18 mm. long, the narrow lobes 6 mm. long, a little longer than the staminodium; ovary pubescent at the tip.—Near *I. sphenophyllus* Schum. of Brazil, but that has glabrous sheaths and corolla and longer bracteoles.

Loreto: Yurimaguas, *Williams 3870*, type.

Ischnosiphon puberulus Loes. Notizbl. Bot. Gart. Berlin 6: 281. 1915.

Stems apparently leafless below; leaves few, puberulent beneath, broadly ovate, subrotund or broadly cuneate at base, 1–2 dm. long and 5.5–8 cm. broad; racemes terminal, 1.5–2.5 dm. long, sessile or on puberulent peduncles about 4 cm. long; bracts 5–8, 3.5 cm. long; sepals linear, one a little broader, about 2 cm. long; corolla purplish, the tube 3 cm. long, the throat barbellate, the lobes narrowly lanceolate, 1.5 cm. long. Neg. 9870.

Loreto: Río Acre, *Ule 9203*.

Ischnosiphon rotundifolius (P. & E.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 95. 1862; 162. *Calathea rotundifolia* P. & E. Nov. Gen. & Sp. 2: 23. 1838.

High-climbing, bamboo-like and branching at the distant leafy nodes; petioles 2 cm. long; leaves suborbicular, acute or very broadly acuminate, glabrous, to 18 cm. long and 12 cm. wide or only 15 cm. long and 12 cm. wide; spikes many, very minutely puberulent; sepals narrowly linear, 2 cm. long; corolla tube puberulent; otherwise unknown.—From a drawing in herb. Dahlem (copy in Field Museum), apparently a very distinct species in its roundish leaves.

Loreto: Yurimaguas (*Poeppig 2186*).

Ischnosiphon surinamensis (Miq.) Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 93. 1862; 60. *Maranta surinamensis* Miq. Linnaea 18: 603. 1844.

Leafy simple-stemmed plants to 3 meters high, sometimes supported in shrubs; petioles calloused, to 1.5 cm. long; leaves ovate, somewhat one-sided at the acuminate tip, glabrous, the under side drying deep brown or dark, mostly about 1 dm. long by 4–5 cm. broad; spikes glabrous, slender, 1.5 dm. long, usually solitary; sepals nearly glabrous, very narrow; flowers 3–4 cm. long, rose, or (according to Tessmann) orange and white, the lip violet-red or yellow and white, the tube orange.—Peruvian material perhaps is better referred to *I. polyphyllus* (P. & E.) Koern., as the leaves are nearly concolorous. The species are not clearly distinct. Neg. 9872.

Loreto: Yurimaguas, *Williams 3931*. Mouth of Río Santiago, *Tessmann 4541* (aff., det. Loesener). Yarina-cocha, *Tessmann 3384* (aff., det. Loesener). Brazil; Guianas. "Aniuji pingullo," "etsonchana."

Ischnosiphon surumuensis Loes. Notizbl. Bot. Gart. Berlin 6: 276. 1915.

Shrubby or clambering, with few remote branchlets; leaves firm, concolorous or nearly so, glabrous, 1–1.5 dm. long and 4.5–5.5 cm. wide, rounded at base, narrowly and very sharply acuminate, little oblique; spikes solitary, 1.5–3 dm. long; bracts glabrous or sparsely puberulent; corolla tube about 3 cm. long, conspicuously pubescent only within; staminodium broadly obovate, over 1 cm. long; sepals and corolla lobes pubescent.—Flowers yellow. Neg. 9873.

Loreto: Iquitos, *Williams 3726*. Brazil.

Ischnosiphon verruculosus Macbr. Field Mus. Bot. 11: 56. 1931.

Differs from *I. Arouma* chiefly by the densely rough-verruculose stems and sheaths; leaves 1.5–2 dm. long and 8–10 cm. wide, ovate, somewhat one-sided at the acuminate tip, glabrous except along the midrib beneath; spikes only 1–2, very minutely puberulent, to 2.5 dm. long; flowers yellow, red, and violet, 2.5 cm. long, the slender tube 1.5 cm. long, the outer narrowly lanceolate, acuminate segments appressed-pilose.

Loreto: Mishuyacu, *Klug 430*, type.

Ischnosiphon wyomingensis Macbr. Field Mus. Bot. 11: 57. 1931.

A scandent plant with yellow and brown flowers, glabrous except for the closely but minutely pubescent bracts 3.5 cm. long, pilose sepals 3 cm. long, conspicuously villous corolla tube 3 cm. long, and sheaths 4–5 cm. long; petioles 1–1.5 cm. long; leaves oblong-elliptic, gradually and subobliquely subcaudate-acuminate, 5–6 cm. broad, about 1.5 dm. long, slightly paler beneath; spikes apparently solitary, about 2 dm. long, 7 mm. thick, not at all flexuous; staminodium oblong-lanceolate.—Distinguished from *I. surumuensis* chiefly by the pubescence and the narrower staminodium, and from *I. Uleanus* Loes. of Brazil by the smaller leaves and strict spikes.

Loreto: Mishuyacu, *Klug 854*, type.

3. MONOTAGMA Schum.

Allied to *Ischnosiphon* but the flowers never geminate and borne in terminal panicles, open or congested and ovoid, or accompanied by a bract-like leaf. Plants often less than 1 meter high, with long-petioled, usually strongly oblique basal leaves.

Leaves oblong- or linear-lanceolate, 1.5–4.5 cm. broad, 2–4.5 dm. long..... *M. angustissimum.*

Leaves broadly ovate-lanceolate or rarely oblong-lanceolate and 5.5–6 cm. wide, usually 6–10 cm. wide or much wider.

Petiole callus obscure, never densely ciliate-barbate... *M. laxum.*

Petiole callus conspicuously thickened, often annulate at base, pilose or barbate.

Petiole callus densely barbate; inflorescence with a leaf.

Bracts conspicuously pilose, few..... *M. contrariosum.*

Bracts glabrous, usually many..... *M. plurispicatum.*

Petiole callus slightly to densely pilose but not annulate-barbate.

Inflorescence with a leaf, spike-like or long-paniculate.
Leaves ovate-elliptic, 6–12 cm. broad.
Inflorescence spike-like; petioles sheathed only below. *M. dolosum.*
Inflorescence usually paniculate; petioles sheathed. *M. anarthronum.*
Leaves oblong-lanceolate, to 3.5 cm. broad. . *M. parvulum.*
Inflorescence without a leaf, ovoid. . . . . *M. spicatum.*

Monotagma anarthronum Macbr. Field Mus. Bot. 11: 58. 1931.

Similar to *M. dolosum,* but the petioles long-vaginate, often nearly to the callus, the leaves 8–12 cm. broad and 2 dm. long, and the panicles not spiciform; sepals 1 cm. long; corolla tube glabrous, nearly 2.5 cm. long, the elliptic lobes 3 mm. long; ovary glabrous.—*M. Ulei* Schum. of Brazil has densely villous spikes only a few cm. long and a pubescent corolla tube only 1 cm. long.

Loreto: San Antonio, Río Itaya, *Killip & Smith 29363.* Alto Río Itaya, *Williams 3251.*

Monotagma angustissimum Loes. Notizbl. Bot. Gart. Berlin 6: 284. 1915.

About 1 meter high, the stems below and leaf sheaths lanuginose; petioles 3–10 cm. long, puberulent; leaves little oblique, pubescent above only on the midrib; panicle spikes about 8 mm. long; panicle bracts 2.5–3 cm. long, puberulent, villous-margined, the shorter floral ones roseate with white margins; sepals elliptic, scarcely 4 mm. long; corolla white, the tube about 12 mm. long. Neg. 9877.

Huánuco: Posuso, 300 meters, *Weberbauer 6763.*—Loreto: Balsapuerto, *Killip & Smith 28680.*

Monotagma contrariosum Macbr. Field Mus. Bot. 11: 58. 1931.

Apparently low, the long (2 dm.) petioles vaginate nearly to the densely barbate callus, this 2 cm. long; leaves very oblique, rounded to the acute base, shortly acuminate, nearly 2 dm. long, half as wide, beneath, with the sheaths, peduncles, and bracts, pilose, glabrous above except for the midnerve; panicle narrow, about 12 cm. long; sepals hyaline, glabrous, 1 cm. long; corolla strongly cucullate; ovary villous at apex.

Loreto: Mishuyacu, *Klug 116,* type.

Monotagma dolosum Macbr. Field Mus. Bot. 11: 58. 1931.

Slender, the stems above, petioles, and leaves beneath minutely pilose; petioles vaginate to about the middle, to 18 cm. long; leaves not or scarcely oblique, acute at base, ovate-elliptic, acuminate, mostly 15–18 cm. long, 6–7 cm. wide, pilose on the midrib above; panicles few, spike-like, about 1 dm. long, nearly glabrous; bracts 17 mm. long; flowers sessile; sepals 1 cm. long, the glabrous corolla tube a little longer, its oblong-elliptic lobes 2.5 mm. long; staminodium nearly 5 mm. broad, deeply emarginate.

Loreto: Yurimaguas, *Williams 5052, 5115.*

Monotagma laxum (Poepp. & Endl.) Schum. Pflanzenr. IV. 48: 168. 1902. *Calathea laxa* Poepp. & Endl. Nov. Gen. & Sp. 2: 22. *pl. 130.* 1838. *Maranta laxa* D. Dietr. Syn. 1: 7. 1839. *Ischnosiphon laxus* Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 85. 1862.

About 1 meter high; basal and stem leaves subequal, to 3.5 dm. long, glabrous except for the tips, the long (to 2 dm.) petioles glabrous or puberulent but not pilose-annulate; panicle with its leaf to nearly 2 dm. long, the racemes few to many; bracts oblong, orange, the lower puberulent, to 3 cm. long; sepals linear, 12 mm. long; tube of the yellow corolla 2.5 cm. long, the lobes about 6 mm. long. —The similar and possibly Peruvian *M. exannulatum* Schum. has roseate flowers with pilose tubes scarcely 2 cm. long. Var. *oblongifolium* Macbr. has leaves oblong, about 5.5 cm. wide, to 3 dm. long, little oblique; sheaths densely long-pilose below; sepals about 17 mm. long. Illustrated, Pflanzenr. IV. 48: 157.

Loreto: Mouth of Río Santiago, *Tessmann 4568.* Iquitos, *Tessmann 5065.* Between Río Nanay and Río Napo, *Williams 721.* San Martín: Tocache (*Poeppig*).—Without locality: *Pavón.*—Huánuco: Monzón, 700 meters, *Weberbauer 3683.*

Monotagma parvulum Loes. Notizbl. Bot. Gart. Berlin 6: 283. 1915.

More or less puberulent nearly throughout, to about 4 dm. tall; leaves not oblique, rounded-cuneate at base; panicle dense; sepals linear-lanceolate, 1 cm. long; corolla white, the tube 1.5 cm. long, the oval lobes 2–3 mm. long; outer staminodia apparently lacking. Neg. 9881.

Loreto: Cerro de Ponasa, 1,200 meters, *Ule 6846.*

Monotagma plurispicatum (Koern.) Schum. Pflanzenr. IV. 48: 169. 1902. *Ischnosiphon plurispicatus* Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 83. 1862.

Acaulescent, 1–2 meters high; petioles of the basal leaves 50 cm. long; leaves glabrous unless at the very oblique tip, several dm. long and 1.5–2 dm. wide; panicle ample, the many bracts glabrous; sepals lanceolate, 7 mm. long; corolla tube glabrous, 12 mm. long; lobes oblong, 4 mm. long.—The ring at the leaf callus base is densely pubescent with hispid or almost bristle-like hairs.

Cuzco: Cosñipata, 700 meters, *Weberbauer 6943* (det. Loesener).—Huánuco: Monzón, *Weberbauer 3604* (det. Loesener).—Loreto: Río Acre, *Ule 9248* (det. Loesener).—Junín: La Merced, *Schunke 592*. Brazil.

Monotagma spicatum (Aubl.) Macbr. Field Mus. Bot. 11: 14. 1931. *Maranta spicata* Aubl. Hist. Pl. Guian. 1: 4. 1775. *Ischnosiphon spicatus* Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 83. 1862. *Calathea Parkeri* Poepp. & Endl. Nov. Gen. & Sp. 2: 22. 1838. *Phrynium Parkeri* Rosc. Monandr. Pl. *pl. 42*. 1828.

Well marked by the lack of a leaf accompanying the narrowly ovoid panicle; leaves very oblique, glabrous except at the tips, to 3.5 dm. long, the petioles elongate; peduncle villous, to 5 dm. long; lower bracts to 6 cm. long; corolla tube puberulent, to 2.5 cm. long, three times as long as the oblong sepals, the corolla lobes to 6 mm. long.

San Martín: Tocache (*Poeppig*). Guianas.

4. MYROSMA L. f.

Similar to *Maranta* technically, but the Peruvian species seemingly all acaulescent and with geminate racemes. Bracts more or less densely imbricate.—Here would be sought the Ecuadorian *Thalia Pavonia* Koern. and *T. Andersonii* Schum., both probably referable to *Myrosma* in a broad sense. The inflorescence of the former is an interrupted panicle; of the latter, a solitary raceme.

Bracts linear-lanceolate.....*M. hexantha.*

Bracts broadly oblong-obovate or subrotund.

Bracts densely imbricate; leaves less than 1 dm. wide.

M. unilateralis.

Bracts loosely imbricate; leaves more than 1 dm. wide.

M. stromanthoides.

Myrosma hexantha (Poepp. & Endl.) Schum. Pflanzenr. IV. 48: 144. 1904. *Thalia hexantha* Poepp. & Endl. Nov. Gen. & Sp. 2: 24. *pl. 132*. 1838. *Maranta hexantha* D. Dietr. Syn. 1: 6. 1839.

Plants to 6 dm. high, with shortly petioled, oblongish leaves to 4 dm. long and over 1 dm. broad, minutely puberulent above; inflorescence stalk to 18 cm. high, the peduncles to 10 cm. long; bracts many, linear-lanceolate, acuminate, green, to 3 cm. long; sepals similar, 1.5 cm. long; corolla tube 7 mm. long; staminodium yellow.

Loreto: Yurimaguas, *Poeppig 2260.*

Myrosma stromanthoides Macbr. Field Mus. Bot. 11: 59. 1931.

Leaves glabrous, broadly elliptic, shortly acuminate, to 7 dm. long, 1.5–1.8 dm. wide, racemes mostly 2–3; peduncles loosely villous, 1.5–5 cm. long, long-bracteate; inflorescence bracts laxly imbricate, about 8–12, scarious-chartaceous, persistent; flowers 7–8, on pedicels scarcely 2 mm. long, usually much shorter.

San Martín: Tarapoto, *Williams 6563, 6017.* "Bijahuillo."

Myrosma unilateralis (Poepp. & Endl.) Schum. Pflanzenr. IV. 48: 144. 1902. *Thalia unilateralis* Poepp. & Endl. Nov. Gen. & Sp. 2: 24. *pl. 133.* 1838. *Maranta unilateralis* D. Dietr. Syn. 1: 6. 1839.

Similar to the preceding, but the leaves narrower, the flowering stalk tomentose, the broadly oblong-obovate bracts very obtuse, and the corolla tube only 3 mm. long.

San Martín: Tocache (*Poeppig*).—Junín: Puerto Bermúdez, *Killip & Smith 26423.*

5. SARANTHE Eichl.

Similar to *Maranta* in its exserted flowers but essentially allied to *Myrosma*, from which genus, in a broad sense, it is not to be distinguished.

Saranthe urceolata Peters. in Mart. Fl. Bras. 3, pt. 3: 167. *pl. 48.* 1890; 139.

Glabrous, to several dm. tall, the petioles 1.5 dm. long, very thickly calloused below the subelliptic leaves, the latter sometimes 2 dm. long and half as wide; racemes solitary, more often many in a compound inflorescence, loosely bracted but the elliptic obtuse bracts about touching; ovary sericeous.—A solitary leaf accompanies the inflorescence.

Loreto: Río Acre, *Ule 9243* (det. Loesener). Brazil; Guianas.

6. MARANTA L.

Tall herbs, branching above, with loosely racemose flowers, or the short racemes paniculate. Bracts few, 1–4. Outer staminodia 2, petal-like. Ovary 1-celled. "Uarama," "uarca," "vijau."

Leaves homotropous, sometimes 1–2 dm. long.

Bracts to 5 cm. long; flowers about 2 cm. long.... *M. arundinacea.*

Bracts and flowers smaller..... *M. divaricata.*

Leaves antitropous, to 7 cm. long..... *M. Ruiziana.*

Maranta arundinacea L. Sp. Pl. 2. 1753; 125.

Glabrous or somewhat pilose, with attenuate-acuminate leaves to 8 cm. broad; racemes terminal, often widely branched, peduncled; bracts linear-lanceolate, to 5 cm. long; flowers white, about 2 cm. long.—Cultivated for the meal prepared from its fleshy rhizomes but not known as native to Peru, unless by the following recent collections. Illustrated, Pflanzenr. IV. 48: 127.

Junín: Chanchamayo Valley, *Schunke.* La Merced, 600 meters, *5350, 5706.*—Loreto: Iquitos, *Williams 3581.* "Shimi-panpana."

Maranta divaricata Rosc. Monandr. Pl. *pl. 27.* 1828; 126.

Similar to *M. Ruiziana,* but the leaves not borne together (homotropous); leaves rarely on petioles 4 mm. long, to 15 cm. long and 6.5 cm. wide, often much smaller; ovary typically sericeous or in the Peruvian form glabrous or nearly so.—The Peruvian material rather doubtful.

Loreto: Mishuyacu, *Klug 1342.*

Maranta Ruiziana Koern. Bull. Soc. Nat. Mosc. 35, pt. 1: 45. 1862; 128.

Widely branched; leaves subsessile, densely puberulent marginally and toward the tips, to 3.5 cm. broad; bracts 2–3; sepals 13 mm. long, slightly exceeding the tube of the white corolla.—Simulating the genus *Stromanthe,* from which it is most easily distinguished by the glabrous ovary. Neg. 9846.

Huánuco: Chicoplaya (*Pavón*). Cochero, *Poeppig 1862.*—Loreto: Cashiboya, *Tessmann 5495.* Mishuyacu, *Klug 251, 1342.* Yurimaguas, *Williams 5051.* "Yunca oca," "sío," "inchahuy," "cuycuy."

7. THALIA L.

Characterized especially and typically by the very short-tubed flowers that are borne in ample, elongate, often diffuse panicles, the few bracts deciduous. Inflorescence with or without a leaf.

Thalia geniculata L. Sp. Pl. 1193. 1753; 173.

Panicle to 4 dm. long, with a solitary leaf; sepals 2 mm. long; outer staminodium violet, 14 mm. long.—General in South America but apparently not definitely recorded from Peru. "Arumarana."

38. BURMANNIACEAE. Burmannia Family

Although this family is widely distributed through Brazil, only the following genera and species have clearly been recorded within Peru. *Apteria* Nutt., distinguished by its 1-celled capsule and broadly winged, forked filaments, has been found as near as Manaos (*A. Ulei* Schlechter, which is, perhaps, *A. hymenanthera* Miq.).

Perianth tubes with broad membranous wings.....1. *Burmannia.*
Perianth tubes not winged.....2. *Dictyostega.*

1. BURMANNIA L.

Very slender, often saprophytic, simple-stemmed, little herbs with scale-like or linear leaves and with 1–several, or rarely many, usually yellowish pink, tubular, regular flowers in a terminal, sometimes capitate cyme. Perianth tube persistent on the 3-celled capsule. Filaments 3, elliptic, merely emarginate.

Burmannia Stuebelii Hieron. & Schlechter, Bot. Jahrb. 54: Beibl. 117: 15. 1916.

Erect, nearly simple, 3–4 dm. high; leaves rosulate, lanceolate, acute or acuminate, 1.5–2.5 cm. long, below the middle 4–5 mm. wide; cyme densely 3–16-flowered; flowers about 1.5 cm. long, tubular, 3-winged, the wings semielliptic, the outer segments triangular-acute, the inner elliptic-obtuse and half as long.—Differs from *B. bicolor* Mart. by the several times larger leaves and the broader petals. According to Weberbauer, "ovary violet, perianth golden yellow." Schlechter, Verh. Bot. Ver. Brandenb. 47: 102–3. 1905, has proposed other segregates of *B. bicolor* from Amazonas, Brazil, notably *B. amazonica*, a little saprophyte without rosette or other developed leaves, and *B. polygaloides* with leafy stems.

Amazonas: Sphagnum moor, Molinopampa, 2,000 meters, *Weberbauer 4341;* 264, 267; *Stuebel 25b*, type.

2. DICTYOSTEGA Miers

The Peruvian species readily distinguished from *Burmannia* by the open inflorescence of lilac flowers. Perianth marcescent. Fila-

ments very short, triangular. Capsule 1-celled but 3-valved at tip.

Dictyostega pectinata Karst. Linnaea 28: 422. 1856.

Erect, simple or nearly so, with geminate racemes of nodding, white or lilac flowers; bracts solitary; perianth subequal; capsule crowned by the persistent flower.—The rhizome scales are pectinate-ciliate.

Huánuco: Monzón, *Weberbauer 3570* (det. Schlechter). Colombia.

INDEX

Aechmea, 585
Agave, 666
Alstroemeria, 663
Amaryllidaceae, 631
Ananas, 591
Aneilema, 607
Anthericum, 622
Anthurium, 442
Araceae, 428
Asterostigma, 484
Athyrocarpus, 605

Billbergia, 583
Bomarea, 633
Bromelia, 577
Bromeliaceae, 495
Burmannia, 767
Burmanniaceae, 767

Caladium, 482
Calathea, 742
Callisia, 606
Campelia, 594
Canna, 739
Cannaceae, 738
Carludovica, 421
Catopsis, 577
Chlidanthus, 669
Chlorophytum, 621
Cipura, 707
Commelina, 602
Commelinaceae, 592
Cooperia, 668
Costus, 730
Crinum, 670
Crocopsis, 669
Cyclanthaceae, 421
Cyclanthus, 427
Cypella, 716

Deuterocohnia, 512
Dichorisandra, 598
Dictyostega, 767
Dieffenbachia, 460
Dimerocostus, 737
Dioscorea, 690
Dioscoreaceae, 690
Distichia, 610
Distrepta, 665
Dracontium, 440

Eichhornia, 608
Eriocaulaceae, 489
Eriocaulon, 489
Eucharis, 673
Eucrosia, 689
Eustephia, 689
Excremis, 618

Floscopa, 600
Fortunatia, 623
Fourcroya, 666

Geogenanthus, 607
Greigia, 579
Guzmania, 570

Haemodoraceae, 630
Heliconia, 718
Heteranthera, 609
Heteropsis, 430
Hippeastrum, 683
Homalomena, 479
Hymenocallis, 670
Hypoxis, 665

Iridaceae, 707
Ischnosiphon, 754

Juncaceae, 609
Juncus, 613

Lemna, 486
Lemnaceae, 486
Liliaceae, 617
Lindmania, 510
Luzula, 610
Luzuriaga, 630

Maranta, 766
Marantaceae, 741
Mayaca, 487
Mayacaceae, 487
Monocostus, 738
Monotagma, 761
Monstera, 434
Musaceae, 717
Myrosma, 764

Nemastylis, 708
Neoregelia, 580
Nothoscordum, 619

Orthrosanthus, 715
Oxychloe, 610

Paepalanthus, 490
Pasithea, 619
Phaedranassa, 688
Philodendron, 464
Pistia, 486
Pitcairnia, 513
Pontederia, 609
Pontederiaceae, 608
Puya, 496

Rapatea, 494
Rapateaceae, 494
Renealmia, 726
Rhodospatha, 431

Saranthe, 765
Sisyrinchium, 709
Smilax, 623
Spathiphyllum, 438
Stenomesson, 675
Streptocalyx, 580
Symphyostemon, 715
Syngonium, 485

Taccaceae, 690
Taccarum, 484
Thalia, 766
Thurnia, 494
Thurniaceae, 494
Tigridia, 716
Tillandsia, 527
Tinantia, 601
Tofieldia, 630
Tonina, 494
Tradescantia, 594
Trichlora, 621

Ulearum, 485
Urceolina, 686
Urospatha, 441

Vriesia, 568

Xanthosoma, 480
Xiphidium, 630
Xyridaceae, 487
Xyris, 487

Zebrina, 608
Zephyranthes, 667
Zingiberaceae, 726

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